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PEYZAJ MİMARLARI ODASI
UCTEA CHAMBER OF LANDSCAPE ARCHITECTS

IFLA
INTERNATIONAL FEDERATION
OF LANDSCAPE ARCHITECTS

IFLA 60TH
WORLD CONGRESS

CODE RED
FOR EARTH

04-06 SEPTEMBER 2024
İSTANBUL-TÜRKİYE

ABSTRACT BOOK
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The 60th IFLA World Congress, held in the vibrant city of Istanbul under the theme "Code Red for Earth," has been a resounding success. As President of the **International Federation of Landscape Architects**, it fills me with immense pride to witness the culmination of years of dedicated work by the **UCTEA Chamber of Turkish Landscape Architects (CTLA)** in bringing together this global gathering of landscape architecture professionals, academics, and students.

With its urgent theme, this IFLA World Congress has underscored the critical role our profession plays in addressing the unprecedented environmental challenges facing our planet. The impressive number of submissions—770 in total, resulting in 366 accepted abstracts and 53 design projects—speaks volumes about the commitment and passion within our global community to contribute to a more sustainable and resilient future.

The Congress theme, **"Code Red for Earth,"** resonated throughout the diverse program, encompassing seven thematic tracks that explored crucial aspects of our profession's response to the climate crisis. From codifying the eco-emergency and fostering global solidarity to promoting sustainable communities, embracing diversity and inclusion, and harnessing the power of digital innovation, the 60th IFLA World Congress has provided a platform for in-depth discussions and knowledge sharing. The nine special roundtable sessions, brought the power of collaboration with the United Nations and its affiliated agencies, international sister organizations in the built environment and local stakeholders to debate the importance of landscape to address the most pressing issues globally.

I extend my sincere gratitude to the **UCTEA Chamber of Turkish Landscape Architects**, especially President Barış Işık and Organizing Committee Chair Yasin Otuzoğlu, for their exceptional leadership and dedication in hosting this landmark event. The tireless efforts of the various committees, sponsors, and volunteers have ensured a seamless and enriching experience for all participants.

The success of this Congress lies not only in the quality of the academic discourse but also in the spirit of collaboration and camaraderie that has permeated the event. The connections forged and the ideas exchanged in Istanbul will undoubtedly inspire and empower landscape architects worldwide to continue pushing the boundaries of our profession in service of a healthier planet.

As we move forward, let us carry the momentum and insights gained from this Congress to amplify our collective impact. The "Code Red for Earth" demands urgent action, and landscape architects, with their unique expertise and perspective, are uniquely positioned to lead the way towards a more sustainable and equitable future for all.

Sincerely,

Dr Bruno Marques

President, International Federation of Landscape Architects

The **60th IFLA World Congress**, hosted by the **UCTEA Chamber of Turkish Landscape Architects**, was held in **Istanbul, Türkiye**, from **September 4-6, 2024**, under the theme **"Code Red for Earth."** This theme highlighted the urgent need for collective action to address the environmental crises facing our planet. It also underscored the critical role that landscape architecture can play in advancing sustainability and resilience for future generations.

The Congress covered a broad range of pressing issues through **seven thematic tracks**, each focusing on a different facet of landscape architecture's contribution to addressing global challenges:

1. **Codifying Code Red: Eco-Emergency, Global Solidarity**
2. **Sustaining Life: Protection, Mitigation & Management**
3. **Cultivating Resilience: Sustainable & Resilient Communities**
4. **Acting for All: Diversity, Equity & Inclusion**
5. **Engaging with the Digital: Innovation, Technology & Big Data**
6. **Projecting the Process: Monitoring, Assessment & Applications**
7. **Building Bridges, Breaking Barriers: Education & Practice**

These tracks reflect the core concerns of landscape architecture today, and the proceedings book compiles the diverse range of **366 accepted abstracts** and **53 design projects** that were submitted from **770 total submissions**. The Congress itself attracted **860 participants** from **52 countries**, creating a vibrant platform for academic and professional exchange.

The Congress owes its success to the collective efforts of the **Organising Committee**, including the Programme Committee and its supporting commissions, as well as the teams managing finance, sponsorship, marketing, and communications. Their unwavering commitment, detailed planning, and collaborative spirit were instrumental in bringing this prestigious event to life.

A special note of thanks is due to the **IFLA Executive Committee**, whose guidance and support were invaluable throughout the Congress's planning and execution, as well as the **students and volunteers**, particularly the **PMOGenç members**, who played a crucial role in ensuring the smooth operation of the event.

In addition to the academic and professional presentations, the Congress was supported by **sponsors** and **expo participants**. Their support was essential to the success of the event, reflecting the diverse sectors within the landscape architecture profession.

The Congress was enriched by a series of **social activities**, including the **Welcome Cocktail** on the first evening, the **Gala Event** on the second evening, as well as the **Walk & Talks** during the pre-congress tours and the **technical excursions** following the Congress. These activities allowed participants to engage with the theme of the Congress in an interactive manner, forging valuable connections and deepening their understanding of the profession's role in global sustainability.

We extend our heartfelt gratitude to all the committees, participants, sponsors, and volunteers whose contributions made the **60th IFLA World Congress** a truly memorable and impactful event. The collective effort of everyone involved has highlighted the power of collaboration in addressing the pressing environmental challenges we face today.

Sincerely,

BARIŞ IŞIK
PRESIDENT, CHAMBER OF TURKISH LANDSCAPE ARCHITECTS

The **60th IFLA World Congress**, held in **Istanbul** under the theme "**Code Red for Earth**," represents the culmination of years of meticulous preparation, unwavering dedication, and extensive collaboration. As the **Chair of the Organising Committee** and **former President of the Chamber of Turkish Landscape Architects (CTLA)**, it is my privilege to highlight the remarkable contributions of the committees and individuals who have worked tirelessly to bring this congress to life.

From the very beginning, the organisation was structured to ensure that every aspect of the congress was addressed with precision and foresight. The **Executive Organising Committee (EOC)** and the **Organising Committee (OC)**, composed of distinguished professionals and leaders from CTLA, oversaw the overall framework of the congress, laying the foundation for a seamless and meaningful event. The collaborative efforts of the **Programme Committee (PC)**, **Finance and Sponsorship Committee (FSC)**, and **Marketing and Communications Committee (MCC)** were crucial in achieving our goals.

A special acknowledgment goes to the **Programme Committee**, whose leadership and subcommittees played a key role in developing the congress's theme and structure. The **Call for Abstracts and Reviews Committee** carried out a rigorous peer-review process, ensuring that each submission adhered to the highest academic and professional standards. This process led to the acceptance of **366 abstracts** and **53 design projects** from a total of **770 submissions**. These impressive numbers reflect the global landscape architecture community's enthusiasm and commitment to addressing pressing environmental challenges.

The **Student Charrette and Competitions Committees** provided platforms for creative exchange and innovation among students, further enriching the congress experience.
I would also like to express my deep appreciation for the tireless efforts of the **Finance and Sponsorship Committee** and the **Marketing and Communications Committee**. Their dedication ensured the **financial sustainability** of the congress and its **successful outreach** to a global audience.

Additionally, I would like to extend a special thank you to the **IFLA ExCo Congress Planning Team**, whose guidance and strategic support were invaluable throughout the planning process. Their contributions helped ensure that this congress would be an outstanding success.

Equally, the dedication and enthusiasm of the **PMOGenç members**, our volunteer students, deserve recognition. Their passion and commitment have played an essential role in the organisation of this congress, and their efforts have been truly invaluable.

This congress is the result of **collective excellence**, embodying the spirit of **unity** and **shared purpose** that defines our profession. On behalf of the Organising Committee, I extend my heartfelt gratitude to every committee member, reviewer, sponsor, volunteer, and collaborator whose contributions have made the **60th IFLA World Congress** a landmark event.

Together, we amplify our call for urgent action—**Code Red for Earth** is not just a theme, but a **global responsibility** that we must embrace.

Sincerely,

YASİN OTUZOĞLU
CHAIR, IFLA 2024 ORGANISING COMMITTEE
PAST PRESIDENT, CHAMBER OF TURKISH LANDSCAPE ARCHITECTS (CTLA)

CODE RED FOR EARTH

The 60th World Congress of the International Federation of Landscape Architecture (IFLA), hosted by the UCTEA Chamber of Turkish Landscape Architects, will be held in Istanbul between 4-6 September 2024 with the theme "Code Red for Earth".

The IFLA World Congress is the most important annual event for the Landscape Architecture profession and the IFLA community. The World Congress offers professional development and networking opportunities for practitioners, entrepreneurs, educators, researchers, students, journalists, as well as anyone interested in the impact of landscape architecture on our society, economy, and culture. It is also an international event where challenges in education as well as current trends and issues in professional practice are discussed and answers to all problems are sought.

Herein, the 2024 IFLA 60th World Congress calls for humankind to take urgent action to prevent the worst impacts of environmental crises. Acknowledging human responsibility, the Congress invites policymakers, professionals, scientists, and individuals on stage to establish discourse and a course for the Earth’s future.

International Federation of Landscape Architects (IFLA)

A truly global federation, IFLA currently represents 77 national associations from Africa, the Americas, Europe, Asia Pacific and the Middle East. Our mission as landscape architects is to create globally sustainable and balanced living environments for the benefit of humanity worldwide.

IFLA officially represents the world body of landscape architects through its member associations and regions and in both governmental and non-governmental organizations, such as the UN, UNESCO, UIA, etc. IFLA is a not-for-profit, non-political, non-governmental organization.

The mission is to promote the landscape architecture profession within a collaborative partnership of the allied built-environment professions, demanding the highest standards of education, training, research and professional practice, and providing leadership and stewardship in all matters.

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The Chamber of Turkish Landscape Architects (CTLA)

The Chamber of Turkish Landscape Architects (CTLA) is a public institution, established on 13/05/1994 with the decision of the 33rd General Assembly of the Union of Chambers of Turkish Engineers and Architects (UCTEA).

Organizing Landscape Architecture in Turkiye started with the "Landscape Architecture Association," CTLA's predecessor organization, which was first established in Ankara in 1966. Today, CTLA, with its headquarters in Ankara, continues its activities with 6 branches, 15 provinces, and 2 district representatives.

The Chamber of Landscape Architects is the only professional organization that gathers within its organization Landscape Architects who are legally authorized to practice their profession and art within the borders of Turkiye and who are engaged in professional activities.

The IFLA 60th World Congress is organized this year by the Turkish Chamber of Landscape Architects, the official representative of Turkiye in the IFLA European region.

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- Call for Abstracts & Reviews
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Ceylan Belek Ombregt

ORAL PRESENTATIONS

Codifying Code Red: Eco-Emergency, Global Solidarity

Economy and Landscape – a vicious circle impacting humanity's future

Didier Vancutsem
LOUISE Laboratory, Faculty of Architecture, Free University Brussels (ULB), Brussels, Belgium

Landscape and Economy have been closely intertwined since the dawn of humanity, but this has not been well researched until now. The discipline of landscape economy is relatively new. In fact, landscape transformation is driven by economic development, and economic investment adds value (negative or positive) to the landscape. In this sense, the investment in the "*"artificialisation"*" of the landscape area depends a lot on how the return on investment and the business model are developed. As our current business model is carbon intensive, based on burning fossil fuels and coal derivatives, it automatically and inevitably leads to intense and irreversible pressure on land, climate and environment through the creation of grey infrastructure, buildings, roads and more. Within this business model, the originally high landscape values become irrelevant as soon as they are artificialised, and landscape interventions are often relegated to the role of "beauty maker". The current degrowth debate is only one aspect of this new awareness.
For example, EU28 land consumption reached 539 km2/year between 2012 and 2018. The main drivers over the period 2000-2018 were industrial and commercial land use, as well as the expansion of residential areas and construction sites (EEA 2019). Europe's urbanisation rate is expected to increase from 74% today to around 84% in 2050 (EU 2020). The EU population is ageing dramatically and is projected to fall to just 4.1% of the world total by the end of the century. On the other hand, migration has become increasingly important to sustain the economy (EPRS 2019). At the same time, urbanisation goes hand in hand with the growing socio-economic benefits that many Europeans have only recently been able to enjoy: better housing, more job opportunities and a better quality of life.

Urban and peri-urban land is scarce, so battles over land use and ownership are in full swing. In and around cities, we need space for climate adaptation, water retention, biodiversity, affordable housing, sustainable transport, social integration, food production - with a forward-looking approach that takes into account the ideas and needs of future generations that we cannot foresee or predict today. These wicked sustainability challenges have already proven intractable to business-as-usual solutions, especially in the short-term context of political elections and sectoral policies.

It is time to think "Landscape First" and change the business model of urban and peri-urban land use development. This paper explores the current debate on the landscape economy, identifies possible new ways of changing the paradigm, and shows how the "Landscape First" approach could be implemented in relation to other business models, in particular the degrowth model.

Keywords: landscape economy, urbanisation, business model, degrowth

Across the estuarial periphery

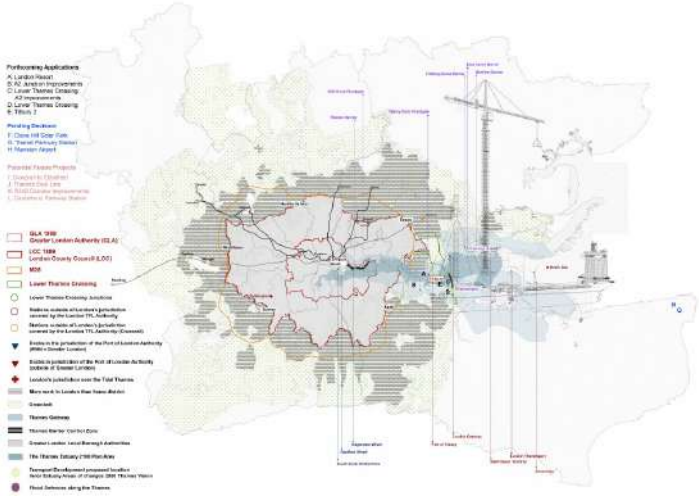
Alexis Liu
Alexis Liu

This research investigates Tilbury and its extended area of East Tilbury on the edge of Greater London in the South-East of England as an estuarial rural-urban fringe in the context of urbanisation. Tilbury sits at the intersection of the estuary, agricultural land, Green Belt, industrial zones, suburban settlements, and port development, forming a global city edge that carries a complexity exacerbated by the dynamic urbanisation process. This study develops a unique methodological model combining mapping, observation, interview, and visual analysis to explore the characteristics of the metropolitan peripheral fringe. This research explains the need for such a range of methodologies, which operate separately yet are combined in different ways to address the specific urbanisation processes that construct the urban fringe relationship between Tilbury, East Tilbury and London and the role of the periphery in regional urban relations. It reveals insights into the changing forms of urbanisation and highlights the impact of London's unrestricted expansion on Tilbury's legibility and identity.

The investigation uncovers conflicts with local communities, environments, landscapes, and cultures in the fringe areas as a result of urban activity, regulation, policymaking, and planning. It reveals that urban challenges created by the industrialisation of the port have led to the fragmentation of the peripheral landscape, less visible multidimensional urbanisation of the estuary, and the loss of local identity and legibility. Based on these findings, the research discusses how the development of urban processes localised in the Tilbury area, the impact of land use and the cultural forms of the landscape are changing the way urbanisation operates and the future trajectories it may take. The study argues that the development of urbanisation has created a new mode of legibility and a new form of identity in the periphery that is distinct from traditional concepts. On this basis, it considers the future of Tilbury and proposes a strategic response that offers new perspectives to the research of urban peripheries in similar global cities.

Keywords: Periphery, urbanisation, urban sprawl, greenbelt, port development

Unsettled edges of Greater London



The boundaries of London's development exist beyond the physical boundaries of the GLA(Greater London Authority), from the intersection of the boundaries between transport, the Green Belt, the tidal jurisdiction of the Thames, and the port's ownership creates unstable boundaries that stimulate the sprawl of the city to the fringes.

Remote Sensing as a Proxy for Urban Air Temperature Studies

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Air temperature is a critical urban climatological parameter impacting human health, energy consumption, and environmental quality. Recent research emphasizes the severity of urban heat in certain microscale areas, necessitating their identification for urban planning and heat mitigation. Traditional methods of collecting microscale air temperature data face challenges due to logistical and financial limitations, as well as inadequate weather station networks. This has shifted the focus towards satellite-based data, specifically for its affordability and superior spatial resolution. However, such data is typically used for land surface temperature (LST) estimation rather than air temperature. This study explores the correlation between air and surface temperatures, assessing the feasibility of using LST as a substitute for air temperature. We employed a field-based air temperature collection method, traversing different areas, and compared it with LST data from Landsat 8, using detailed statistical and spatial analyses. This also included evaluating various climatological and landscape factors. Our findings reveal: 1. Both air and surface temperatures display significant spatial variability within urban areas, indicating zones of heightened heat stress and health risk at the microscale. 2. Air temperature complexities surpass those of LST, influenced by a broader range of urban environmental factors, highlighting the need for further investigation into these varying impacts. 3. A substantial statistical and spatial correlation between air and surface temperatures validates the use of LST as a proxy for studying air temperature. 4. Incorporating urban landscape and climatological elements can enhance the effectiveness of LST as a surrogate for air temperature. These insights could form the foundation for rapid, cost-effective methods in urban air temperature research, especially beneficial for cities or teams constrained by inadequate weather station networks or field data.

Keywords: Thermal heterogeneity, urban heat island, urban climate, urban planning, spatial heterogeneity

Beyond the green space per capita: An exploratory research

Myriam Ana Martinez Dupont, Marina Lorena Butus, Vanina Martínez, Federico Sebastián Solari, Valeria Caro Marcó
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Green space per capita is a well-known global indicator of the environmental benefits of public green spaces (PGS) in cities. It is an indicator proposed by the UN that ranges from 10 m2 to 15 m2 of green space per capita. In our research on this topic, we have not found the original document that methodologically supports the determination of the green space per capita indicator attributed to the UN. Even if more m2 of PGS per capita, well distributed and in good condition, are a social benefit of appropriation and collective social construction, the environmental benefits attributed to the mitigation of the urban heat island (UHI) phenomenon are not so obvious. The Department of Green Spaces (FCA, UNER) has demonstrated that trees along the pavement improve the habitability of the pavement in the shaded environment projected by the canopy, since it lowers the temperature and increases the relative humidity, with a difference in T° of up to 9 °C with other parallel and nearby streets that do not have trees along the pavement (Folla et al., 2000). This research has shown that in the city of Paraná, Entre Ríos province, the increase in T° at different points of a PGS and in different situations of sun and shade does not evolve in an inversely proportional relationship to the green space per capita of its territorial reference sector (census tract). That is, in the census tracts with more m2/capita, the lowest temperatures per season should be recorded and vice versa. However, different results were obtained from the data collected and its processing. For example, the PGS with the highest average summer temperature for a sun-on-concrete situation: 45.44 °C corresponds to the census tract with the highest value of green space: 28.2 m2/capita, while in another PGS belonging to a census tract with 4.46 m2/capita, the summer average for the same conditions was 38.34 °C. There is a clear tendency: certain T° and H° are mainly related to the thermal energy exchange of the grey infrastructure (GI) and its capacity to absorb and return it, and that the presence of more m2 of green space per capita does not have a direct relationship with the moderation of T° in the area. It is therefore concluded that the presence of PGSs alone does not mitigate the UHI effect, and that the decrease in T° sometimes follows an environmental pattern generated by contextual urban spatial qualities. In order to attribute environmental benefits to PGSs, they must meet specific qualities and requirements with respect to the surrounding GI.

Keywords: urban heat island phenomenon, green space per capita, public green spaces, environmental benefits.

Gráfico 43. Relación entre Tº promedio de verano y AV/H de la FC- SOL-CEM. Fuente: Elaboración propia.

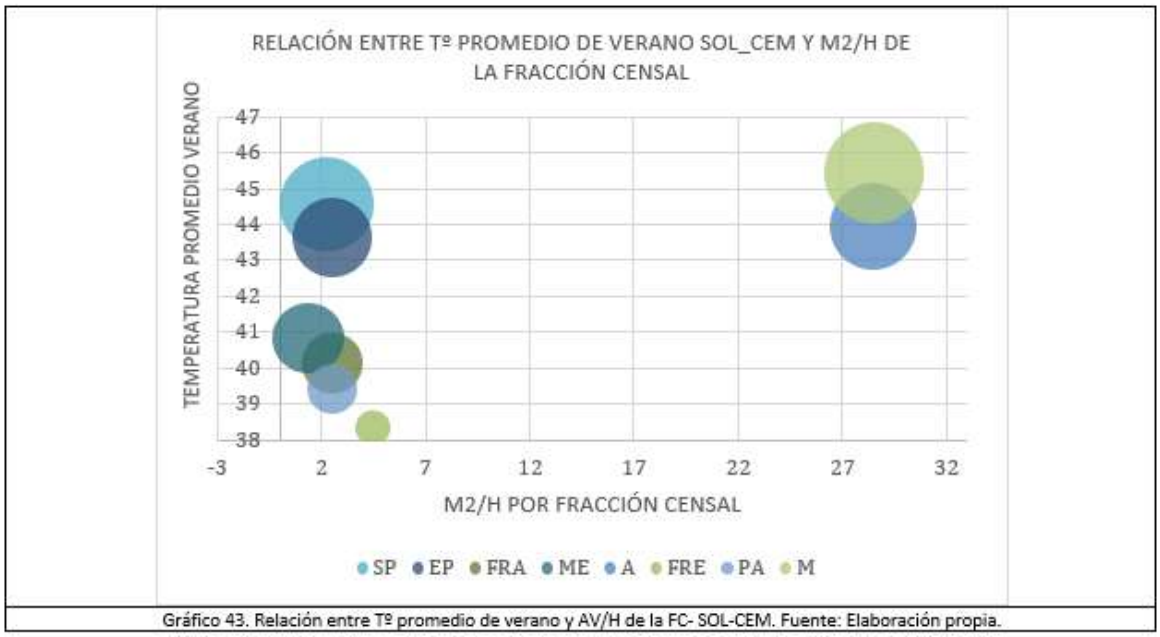

Gráfico 43. Relación entre Tº promedio de verano y AV/H de la FC- SOL-CEM. Fuente: Elaboración propia.

En el gráfico 43, cambian algunas cuestiones por una diferente división territorial, se observa que la FC con mayor AV/H es la que contiene a las P. Mansilla y Alvear cuyos valores son el más elevado y el tercero en el mismo orden. Se observa igualmente como en el gráfico 42, que no hay correlación comportamental entre estas dos variables. Es decir, si la sola presencia de mayor porcentaje de AV/H cumpliera con beneficios ambientales de morigerar el ICU, debería haber una correlación directa entre el % de AV/H y el descenso de Tº, cosa que definitivamente no se comprueba.

Urban Parks' Cooling Islands Effect in Hot and Humid Areas

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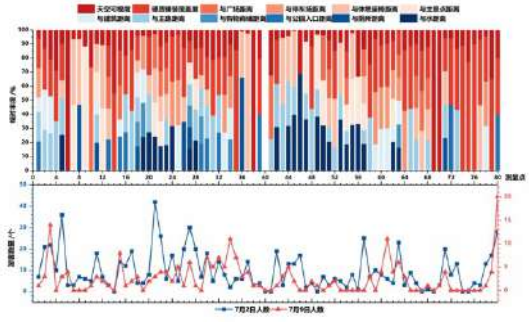
This study aims to investigate the impact of landscape elements, microclimate factors, and thermal comfort indexes on the attractiveness of urban parks under different temperatures of 30℃ and 40℃ in summer of humid and hot areas. By conducting microclimate measurements and behavioral note surveys in Chengdu Jincheng Park, combined with the calculation of thermal comfort indexes, ArcGIS matrix grid visualization, and multiple regression analysis, the number of visitors was used as a mediating variable to quantitatively evaluate the degree of influence of each index on park attractiveness. In order to provide a basis for the design of climate suitability in coping with summer heat waves in the hot and humid areas of the Southwest Basin. The results show that: 1) Solar radiation is still the most critical microclimate element affecting thermal comfort and park attractiveness in summer, but wind speed and relative humidity are more significant at 40℃. 2) All 12 landscape elements significantly affect park attractiveness, with sky view factor (SVF) being the most critical factor affecting thermal comfort. However, SVF only becomes the most critical factor attracting visitors at 40℃ high temperature, while the landscape near the water at 30℃ is the most attractive; 3) The UTCI and PET indicators perform best for outdoor thermal comfort evaluation, while WBGT is poor. However, after superimposing the number of visitors, UTCI's performance becomes unstable at 40℃.

Keywords: LandscapeArchitecture, ClimateSuitability, UrbanPark, HumidAndHotArea, ThermalComfort

Abundance of landscape elements and number of tourists at each measuring point



Meteorological factors and thermal comfort matrix grid distribution diagram of measuring points

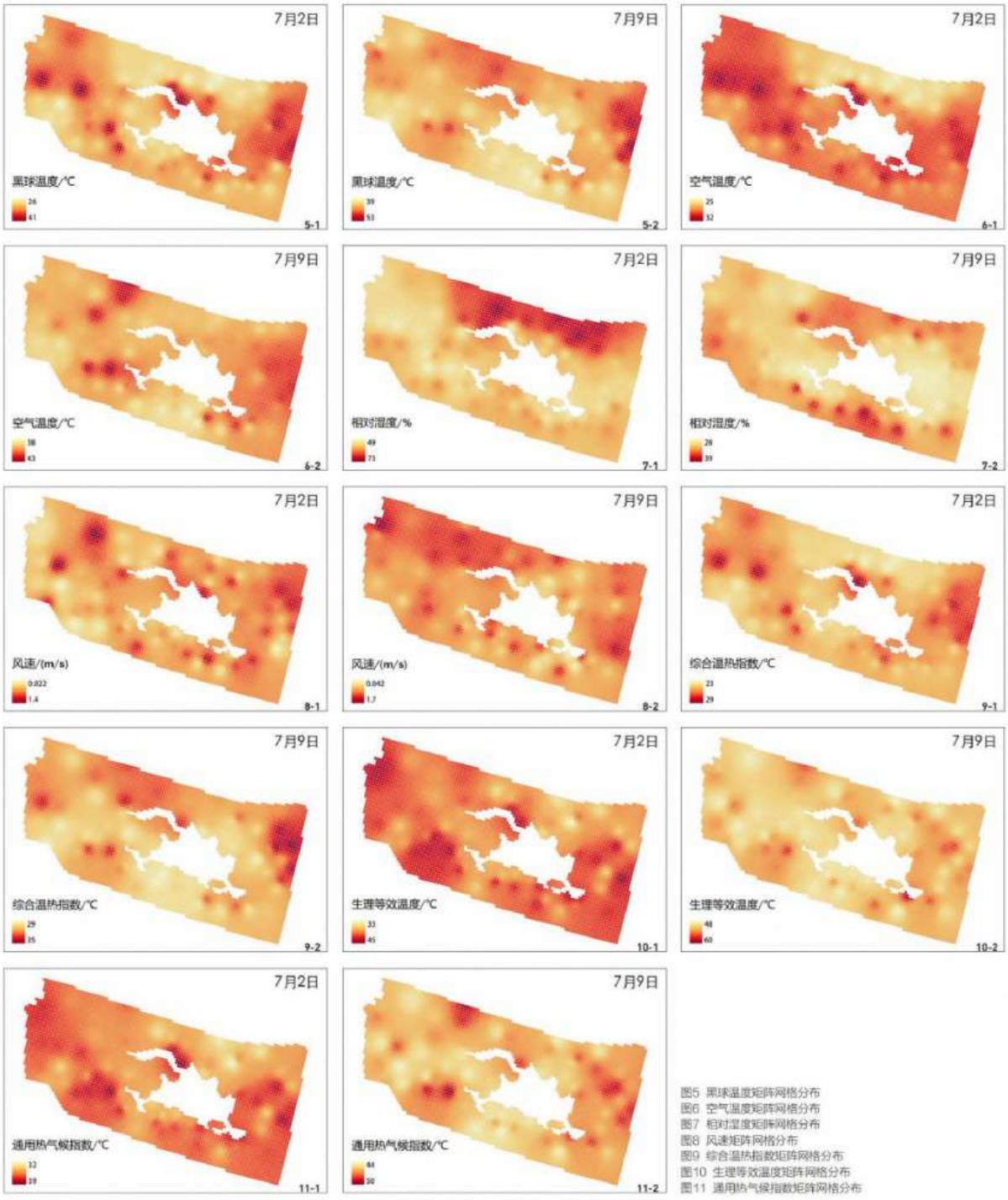


图5 黑球温度矩阵网格分布
图6 空气温度矩阵网格分布
图7 相对湿度矩阵网格分布
图8 风速矩阵网格分布
图9 综合温热指数矩阵网格分布
图10 生理等效温度矩阵网格分布
图11 通用热气候指数矩阵网格分布

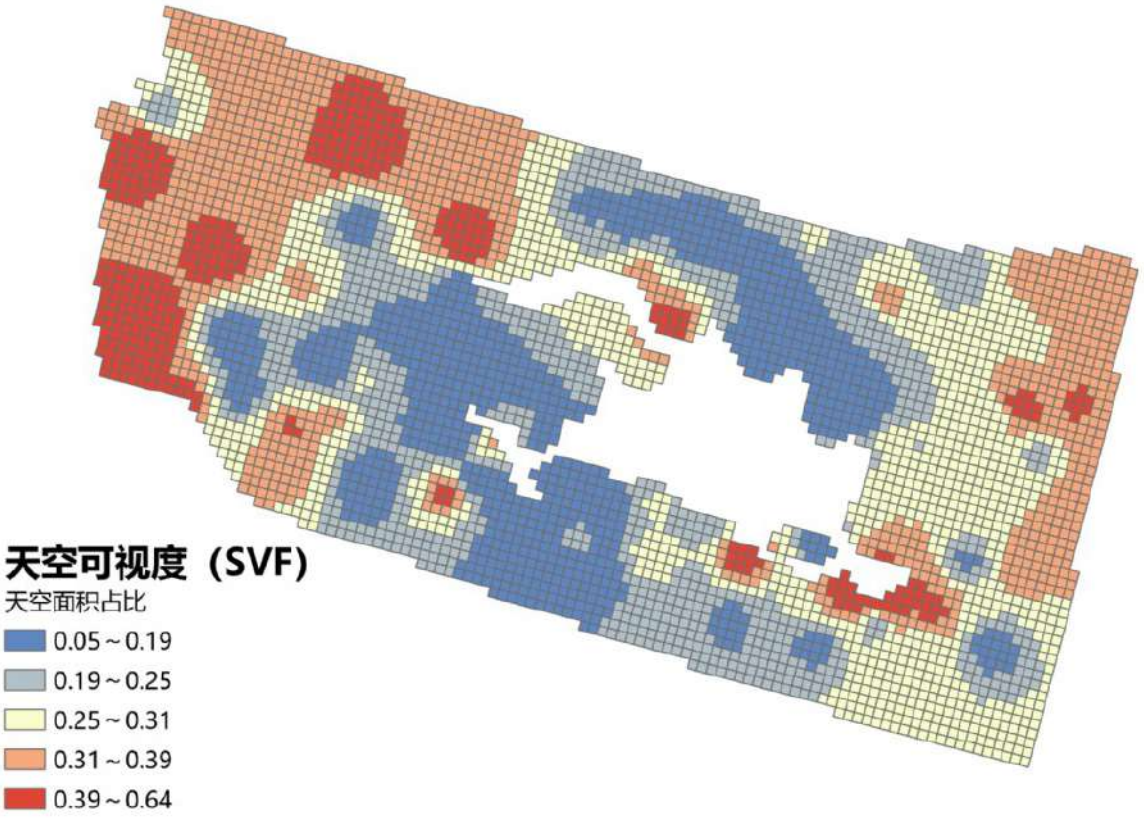
Ordinary Least Squares (OLS) regression results

July 2-Variable	Beta Coefficient	StdError	t-Statistic	Pr	Robust-Pr
Ta	-0.469	0.853	-0.549	0.583	0.557
RH	0.042	0.119	0.354	0.723	0.745
V	0.813	1.118	0.728	0.467	0.639
Tg	0.708	0.113	-6.288	0.000*	0.000*
Tmrt	0.887	0.299	2.959	0.003**	0.031*
PET	-16.047	1.871	-8.576	0.000**	0.000**
mPET	11.765	2.819	4.173	0.000**	0.002**
WGBT	1.642	0.342	4.805	0.000**	0.000**
UTCI	-3.682	1.097	-3.355	0.001**	0.003**
Sky View Factor(SVF)	-3.706	1.272	-2.913	0.004**	0.041*
Distance_Water	9.392	0.303	31.020	0.000**	0.000**
Distance_Toilets	9.499	0.439	21.657	0.000**	0.000**
Distance_Park Entrance	4.996	0.301	16.589	0.000**	0.000**
Distance_Parking Lot	3.835	0.456	8.413	0.000**	0.000**
Distance_Shopping Centers	4.896	0.428	11.451	0.000**	0.000**
Distance_Plaza	-1.908	0.355	-5.375	0.000**	0.000**
Distance_Leisure Seats	1.203	0.290	4.150	0.000**	0.000**
Coverage of Hard Pavement(CHP)	0.867	0.301	2.885	0.004**	0.020*
Distance_Main Road	0.797	0.308	2.588	0.010**	0.032*
Importance of attractions(IOA)	1.232	0.351	3.516	0.001**	0.020*
Building Shade(BS)	-2.719	0.418	-6.498	0.000**	0.000**
R^2: 0.526	Adjust R^2: 0.524		Pr(>chi-square), (23) degrees of freedom:: 0.000*		

July 9-Variable	Beta Coefficient	StdError	t-Statistic	Pr	Robust-Pr
Ta	0.632	0.684	0.925	0.725	0.384
RH	-1.913	0.154	-12.428	0.000**	0.000**
V	5.825	0.832	6.998	0.000**	0.000**
Tg	-0.434	0.050	8.659	0.000**	0.000**
Tmrt	2.204	0.277	7.970	0.000**	0.000**
PET	1.858	0.593	3.131	0.002*	0.014*
mPET	-20.451	1.580	-12.940	0.000**	0.000**
WGBT	-1.009	0.130	-7.743	0.000**	0.000**
UTCI	0.771	0.697	1.107	0.269	0.275
Sky View Factor(SVF)	11.806	0.697	16.938	0.000**	0.000**
Distance_Water	-0.592	0.145	-4.088	0.000**	0.000**
Distance_Toilets	0.773	0.203	3.810	0.000**	0.008**
Distance_Park Entrance	2.802	0.144	19.532	0.000**	0.000**
Distance_Parking Lot	0.739	0.216	3.421	0.007**	0.027*
Distance_Shopping Centers	3.075	0.241	12.776	0.000**	0.000**
Distance_Plaza	-3.772	0.172	-21.996	0.000**	0.000**
Distance_Leisure Seats	1.351	0.154	8.763	0.000**	0.000**
Coverage of Hard Pavement(CHP)	0.450	0.130	3.461	0.001**	0.004**
Distance_Main Road	-2.451	0.146	-16.826	0.000**	0.000**
Importance of attractions(IOA)	1.677	0.182	9.218	0.000**	0.000**
Building Shade(BS)	1.096	0.188	5.841	0.000**	0.000**
R^2: 0.521	Adjust R^2: 0.519		Pr(>chi-square), (23) degrees of freedom:: 0.000*		

Note: **Correlations are significant at the 0.01 level, *Correlations are significant at the 0.05 level.

Park grid division and sky view factor(SVF) matrix distribution



Impact on City Image of Bingöl's Native Oaks

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Native plants in urban areas have influences of the essence on the urban landscape. In addition to their ecological functions, they can define and characterize the city, contribute to its identity, and strengthen the sense of belonging for urban residents through the situations embedded in their memories. At the same time, they create an urban image as strong landscape elements and allow soft landscaping applications in built areas in accordance with the situation principle. In this research, oaks ("*"Quercus spp."*") growing naturally in Bingöl City were discussed. Oaks have a significant impact on Bingöl's rural and urban landscape through the forests they create. However, human pressures have resulted in the disappearance of oaks in urban areas, leaving them only on the peripheries of the city. In order to better understand the local people's perspective on this change in Bingöl and the impact created, interviews were conducted with participants selected from the local people living in the city. A semi-structured interview paper was prepared and interviews were conducted with 10 participants from different age groups. As a result of the interviews, differences were observed in terms of perspectives and experiences on oak trees among participants representing different age groups. Since oak vegetation has declined from the city center towards its peripheries due to human pressures, past experiences could not be transferred to the future. In addition, since the oak species that grow naturally in Bingöl are not planted in public green areas such as parks, squares, and medians in the urban area, the oaks have been declined to "greenery" in the mountains surrounding the city. Therefore, the correlation established with oaks in the past could not be transferred to the future. Planting naturally growing oak species in open and green areas of the city; the spreading of compositions and solitary uses that support the local landscape character and enrich the image in the urban area will contribute to re-strengthening this correlation.

Keywords: Bingöl, Native Plants, Oaks, City Image, Interview

Exploitation of natural resources, forced removals and ghosted landscapes

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The increase in urban environmental disasters is a global emergency. There are landslides, floods, earthquakes, droughts, but there are also those caused by the exploitation of the Earth's natural resources. The *top-down* implantation of large infrastructures by powerful companies has been causing *in silence* environmental damages of enormous scale and territorial impact. Given that this ongoing phenomenon is a symbolic image of global urbanisation, our objective is to identify the challenges and perspectives resulting from drastically transformed landscapes. This will be achieved through an analysis of three case studies involving forced removals and undergoing a process of obliteration in both their physical and symbolic aspects at different stages. The first, in Maceio (Brazil), our hometown and the empirical motivation for this research, is about an imminent risk of land collapse that has led to the ongoing forced removal of more than 57,000 residents from nearly five neighbourhoods since 2019, triggered by the destabilisation of cavities from the rock salt extraction operated for more than four decades by a petrochemical company. The second, in Kiruna (Sweden), is also related to mining activities; the idea of relocation of almost 18,000 residents was announced in 2004 due to the risk of ground subsidence and collapse as a result of iron ore exploration. The third, Aldeia da Luz (Portugal), involves the displacement of a village of 400 people as the area was going to be immersed by a dam, which began in the late 1980s. Through a comparative study of the two European cases and the current urban disaster in the South American case, the purpose of this paper is to present an analytical framework for reflecting on the various spatial and social impacts caused by large-scale exploration activities in localities. Although the discussion about these issues have been around for a long time, they still provoke intense debates among different fields of study regarding the interaction between the economic exploitation of natural resources and the radical transformation of spaces. After all, what does the idea of ghosted landscapes represent in the study cases scenario? And what actions have been taken *or not taken* in the two European case studies that can help us to think about possible futures for Maceió, Brazil?

Keywords: exploitation of natural resources, forced removals, ghosted landscapes, urban-environmental disaster

Ghosted landscape

Part of the inhabitants removed area in Maceió-Brazil.

"Park City" theory: Urban parks system in High-density urbanization

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The rapid growth of high-density urbanization challenges ecology and residents' health, especially during the pandemic. Urban parks systems, serving as spaces for recreational activities and supporting facilities for residential areas, enhance living wellbeing and provide quality ecological products. It is a crucial foundation for realizing people's growing aspirations for a better life.

Emphasized the significance of urban parks system, our team explored and implemented the Park City theory in Chengdu, China, a major city in Southwest with about 17 million citizens, achieving multi-dimensional integration of urban elements and mixed-use layouts. The theory also explores the high-quality service and sustainable development of parks and even public spaces.
Chengdu faces various challenges with continuous urbanization, including deteriorating ecological environments, evolving industrial patterns, and increasing demands for quality living, balanced development, and ecological products. Leveraging Chengdu's rich ecological and cultural resources, we applied the "Park City" theory, which includes the " Urban Scenes Creation" design classification and the "Five States Coordination" model.
1. Through the " Urban Scenes Creation " design classification, six types of "Park Scenarios" are created: scenery of landscape ecological park, country park, Tianfu greenway park, urban blocks, cultural Chengdu, and industrial community.
2. Through the "Five States Coordination" model, five typical urban greening strategies are created: ecological embedding, form coupling, cultural integration, business mixing, and living aggregation. Ecological embedding focuses on enhancing ecological benefits, boosting urban resilience, increasing biodiversity, improving air and water quality. Form coupling emphasizes optimizing spatial layouts, transforming idle spaces into urban pocket parks, increasing accessibility. Cultural integration concentrates on strengthening distinctive landscape characteristics. Business mixing focuses on industrial development, especially green industries, promoting value transformation through compatible commercial and service products. Living aggregation prioritizes service provision and activity operation, emphasizing leisure tourism and branded communication events. The “Five States Coordination" model guide the construction of "Park Scenarios", creating the urban parks system with comprehensive functions and unique strengths.

With the support of Ministry of Natural Resources, Ministry of Housing and Urban-Rural Development and other stakeholders, Chengdu is advancing the Park City construction. Several urban park demonstration areas are being built in Chengdu, helping transform the high-density urban areas into a green, livable, and internationally recognized destination. The "Park City" theory was First prize of Science and Technology Progress Award of CHSLA（ Chinese Society of Landscape Architecture） in 2021, being widely discussed in the country.

Keywords: "Park City" theory, High-density urbanization, Urban parks system, Well-being

Ecological Degradation Assessment of Land Use: An Example of Ankar

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The rapid expansion of human activities and its pressure on land use and urbanization causes the degradation of ecological processes. Negative effects on land, water, soil, air, and biodiversity reduce the quality of the landscape. Monitoring ecological processes and identifying areas of degradation are crucial for preventing or reducing negative impacts of ecological degradation such as drought, loss of biodiversity, and declining agricultural production.

The central districts of Ankara (Etimesgut, Çankaya, Altındağ, Keçiören, Pursaklar, Mamak, Gölbaşı, Yenimahalle and Sincan) were taken as the study area and ecological degradation was identified by focusing on these districts. Ankara has experienced one of the fastest urbanisations in Turkey in the last 30 years with a population increase from approximately 2.5 million to 5.5 million. Population growth and increasing human needs have led to changes in land use.

The aim of the study is to assess the change in ecological processes based on landscape patterns and to determine the areas of ecological degradation. In this context, the change in landscape functions (erosion risk, water processes, habitat, etc.) between 1990-2018 was evaluated. As a result of the assessment, ecological degradation areas were identified. These degradation areas were compared with the current planning strategies in practice for the city of Ankara and the areas requiring urgent intervention were emphasized. The identification of ecologically degraded areas is important for decision-makers to address land management and spatial planning from an ecological perspective, to protect and develop resources, and to transfer them to future generations with a realistic approach.

Keywords: landscape pattern, ecological degradation, ecological process, land use change, Ankara

Light Rail Vs. Highway: Influence on land-use & habitat fragmentation

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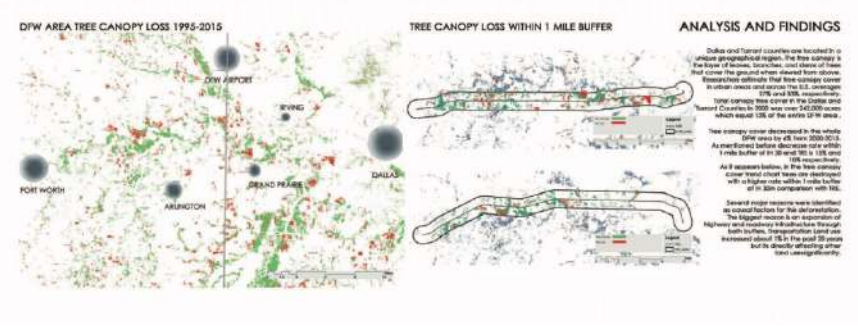
SWA Group, Dallas, Texas, USA

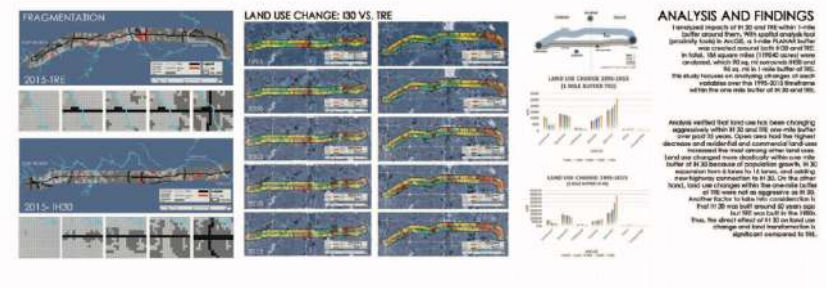
The purpose of this research is to assess and investigate the impact of expanding the Light Rail Transit (LRT) systems versus conventional highway systems for land use change, land formation, and habitat fragmentation in the Dallas Fort Worth (DFW) metropolitan area as a highly developing urban area. The DFW metropolitan area is one of the fastest growing urban areas in the United States (U.S. Census Bureau, 2016). Successfully accommodating this population growth requires north Texans to collectively address important issues including: environmental degradation, landscape formation and fragmentation, suburban sprawl, lack of public transportation, transportation expansion, and energy consumption. Habitat fragmentation caused by transportation infrastructure has gained attention and importance during the last couple of decades. With their larger size and higher traffic volumes, highways represent a serious threat to wildlife, affecting a wider range of wildlife species and presenting an almost impassable barrier for many species (Jackson, 2000). The impact of roads on wildlife can be pervasive as roads can cause numerous fatalities as a result of collisions with the vehicles that travel on them (Malo et al., 2004; Saeki and Macdonald, 2004; Ramp et al., 2005). While LTRs are not free from negative impacts on habitat, however it is more environmentally friendly compare to highway system in many ways such as: Reduce greenhouse gas emissions, facilitate compact development, conserving land, and saving energy (Federal Transit Administration, 2016). This research compared impacts of Dallas Fort Worth Turnpike and Trinity Railway Express (TRE) between downtown Dallas to downtown Fort Worth. Analyzed variables are land use change, tree canopy cover change, and habitat fragmentation and habitat mortality. Both DFW Turnpike and TRE passing through 2 exceptional Cross Timbers and Blackland Prairies ecological regions. Currently there are more than 80 endangered and threatened species in the area of study (Texas Park and Wildlife Department, 2018). Spatial analysis and historic mapping over the chosen timeframes of 1995, 2000, 2005, 2010, and 2015 were used to quantify the degree of land use changes within the one-mile buffer of DFW Turnpike and TRE. Habitat fragmentation and land transformation were analyzed by comparing patch numbers and mean patch size area. Based on Analysis negative impacts of DFW Turnpike and TRE over the past 25 years are undeniable. Direct and indirect effects of each on analyzed variables are different. Although, direct negative effects of DFW Turnpike during construction, short-term, and long-term is noticeably higher than TRE.

Keywords: Urbanization and Sprawl, Environmental Degradation, Urban Planning, Habitat Fragmentation

Analysis and Findings

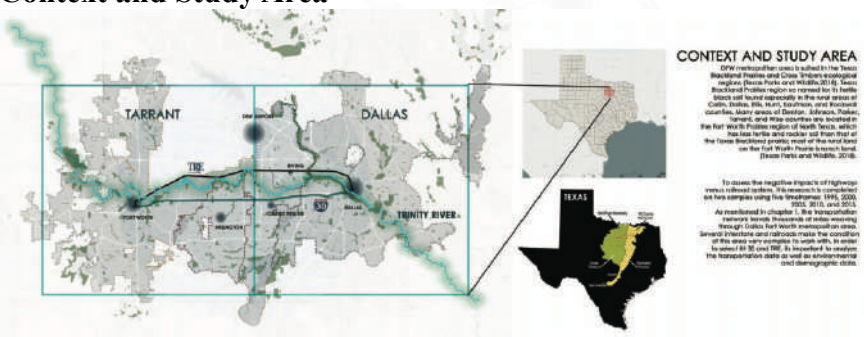


Analysis and Findings



the attached file includes some of the analysis and findings of the research.

Context and Study Area



The attached file contains contextual information of the study area and its importance within the region.

Carbon Dynamics in Water-Rich Cities: A Climate Perspective

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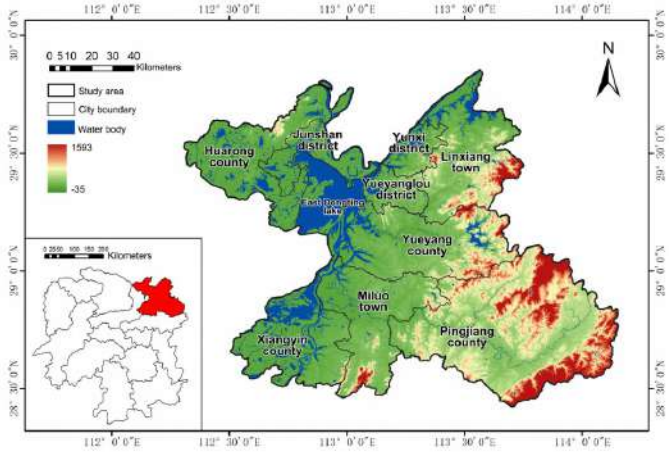
In recent years, climate change has posed significant challenges to global carbon management. Urban areas, as the main contributor of carbon emissions, are pivotal in augmenting natural carbon sequestration processes. Cities with abundant water resources, such as rivers, lakes, and wetlands, are particularly poised to lower atmospheric CO2 levels by increasing their carbon storage (CS). Therefore, elucidating the carbon dynamics of these water-rich cities under various climate change scenarios is crucial to promote sustainable urban planning. This study proposes a comprehensive framework for quantitatively evaluating the future CS of water-rich cities. Firstly, we developed a coupled model integrating the System Dynamics (SD) model with the Patch-Generating Land Use Simulation (PLUS) model to predict the land use and cover changes for Yueyang City in the years 2030 and 2050, under three Shared Socioeconomic Pathways-Representative Concentration Pathways (SSP-RCP) scenarios. Then, the Integrated Valuation of Ecosystem Service and Tradeoffs (InVEST) model is employed to simulate spatiotemporal CS dynamics based on future land-use maps and carbon density data. The findings indicate that CS is projected to peak at 548.08 Tg by 2050, following a modest decline in 2030 under the SSP126 scenario. Conversely, as for the SSP245 scenario, CS is anticipated to increase steadily by 2030, before experiencing a significant reduction by 2050, culminating in the second highest value of 545.36 Tg. Considering the SSP585 scenario, however, CS is predicted to exhibit a consistent downward trend, reaching its lowest at 540.90 Tg by 2050. The study also indicates that the conversion of lakes into wetlands may initially enhance CS, yet, over the long term, CS is likely to decline due to water depletion and forest degradation. These results underscore the importance of moderate economic development, slower population growth, and the conservation of water resources in promoting CS. This study provides theoretical and methodological insights that support climate-resilient urban planning and policy-making.

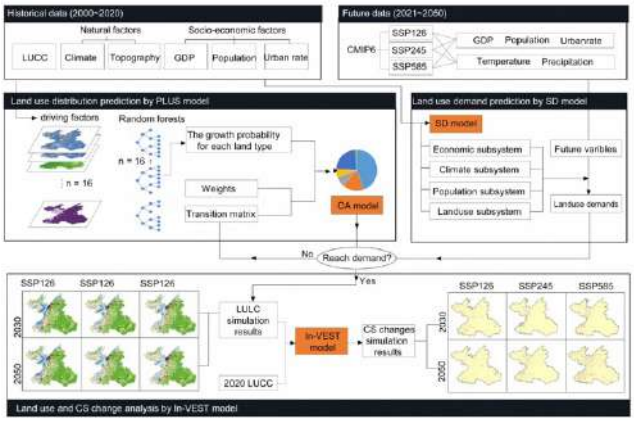
Keywords: climate change, SD-PLUS, system dynamic model, water-rich city, carbon storage

Figure 1 Location, topography, and water bodies of the study area



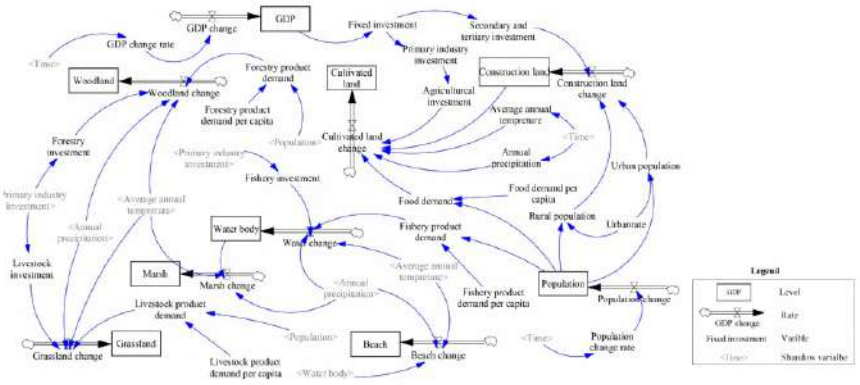
Yueyang, located in northeastern Hunan Province, has a total area of 14,858 km² and holds 21.9% of the city's total water and water facilities land (from the official website of the Yueyang Government), making it a typical water-rich city in China.

Figure 2 Framework of future CS change assessment using the SD–PLUS–InVEST model



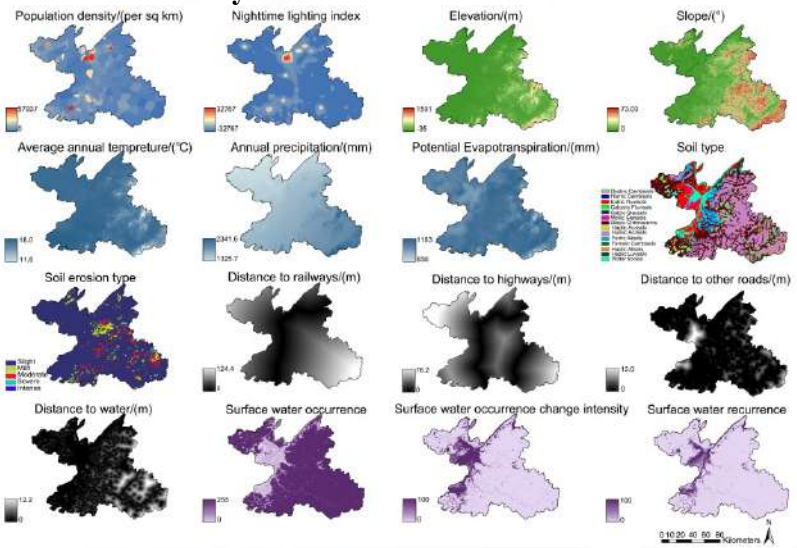
Our proposed framework includes the SD, PLUS, and InVEST models. First, we constructed a climatic–socioeconomic parameter set for each scenario and utilized the SD model to predict land use demand. Then, the PLUS model was employed for spatial distribution based on demand. Finally, the land use patterns were input into the InVEST model to assess dynamic CS changes under different scenarios.

Figure 3 Causal feedback diagram in the SD model of land use change in the study area



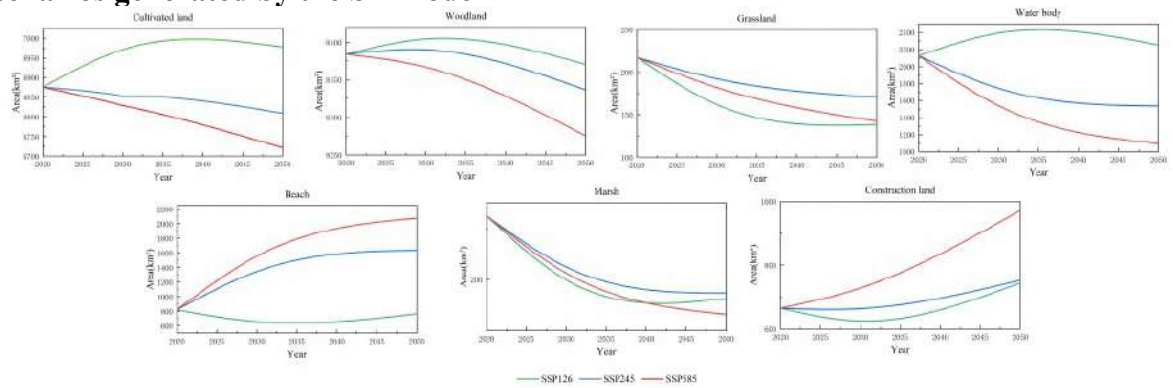
The simulation phase was 2000–2050, and the time step was one year. The verification and prediction phases were 2000–2020 and 2021–2050, respectively. Multiple experiments based on historical data from 2000 to 2020 determined the causal relationships and functions among the variables. Then, a causal feedback model was constructed in Vensim PLE.

Figure 4 Sixteen climatic, topographic, socioeconomic, and hydrologic driving factors of LUCC in the study area



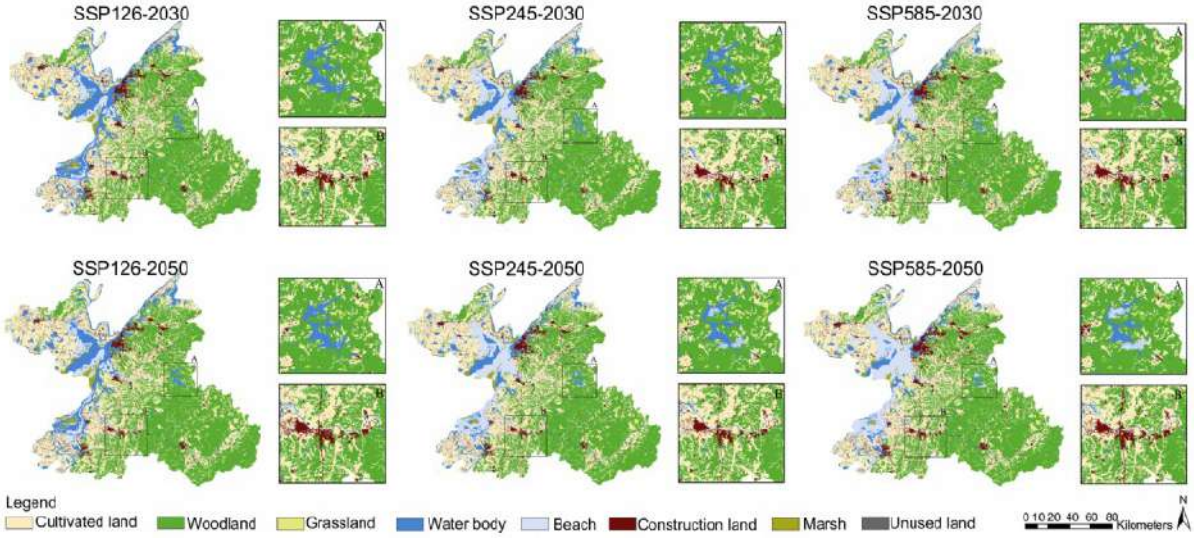
The 16 types of driving factors selected in this study included population density, nighttime lighting index, elevation, slope, average annual temperature, annual precipitation, potential evapotranspiration, soil type, soil erosion type, distance to railroad, distance to primary road, distance to secondary road, distance to water body, and three long-term surface water change data, including occurrence, occurrence change intensity, and recurrence.

Figure 5 Land use demand for 2021–2050 under the SSP126, SSP245, and SSP585 scenarios generated by the SD model



The area of most land types showed similar trends over time, but there were significant differences in cultivated land, water bodies, and beaches under different scenarios. At first, the area of cultivated land increased under SSP126 and then tended to level out and slowly decrease. It continued to decline under SSP245 and SSP585. The area of water body increased first under SSP126 and then reduced to almost equal in 2020, showing a decline before stabilizing under SSP245 and SSP585. Meanwhile, the area of beaches changed in an opposite pattern.

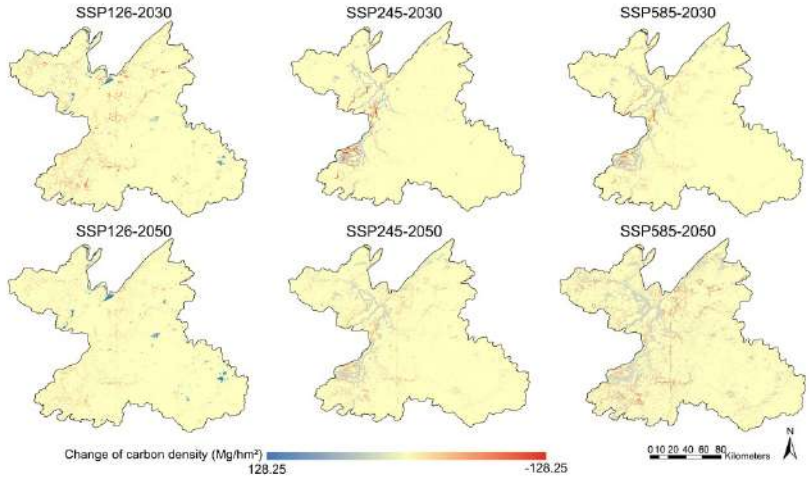
Figure 6 Land use patterns for 2030 and 2050 under SSP126, SSP 245, and SSP585 scenarios simulated by the PLUS model



Under the SSP126 scenario, construction land expanded at a slower rate while cultivated land expanded in the southeastern area of Yueyang. The northern part of East Dongting Lake grew swiftly, encroaching upon grassland, beach, and marsh. Under the SSP245 scenario, a large area of water body and marsh was converted to beaches. At the same time, construction land in Huarong District and Yueyanglou District expanded into the eastern cultivated land. In the case of SSP245, in Pingjiang District, new urban clusters quickly erupted and replaced cultivated land, woodland, and grassland, swiftly transforming into construction land. In the East Dongting Lake area, under the SSP245 and SSP585 scenarios, the water body in 2050

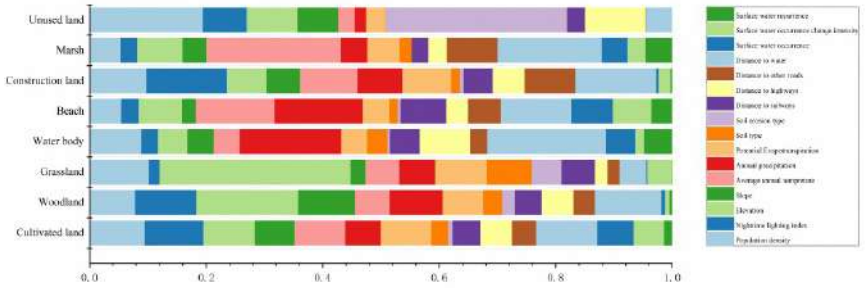
shrank by 26.8% compared with that in 2022. The shrinkage of water bodies in 2050 was 26.8% and 60.8% compared with 2022 under the SSP245 and SSP585 scenarios, respectively.

Figure 7 Spatial distribution of CS changes in 2030 and 2050 under the SSP126, SSP245, and SSP585 scenarios compared with 2020



LUCC revealed the spatial drivers of CS changes. In the SSP126 scenario, from 2020 to 2030, the area of water bodies rose and inundated some cultivated land, woodland, and grassland, and CS decreased slightly by 0.25 Tg. From 2030 to 2050, there was a clear trend of cultivated land expansion, especially in the northern East Dongting Lake in Junshan District. CS showed a large increase (0.71 Tg) and finally reached 548.08 Tg. In the SSP245 scenario, CS temporarily rose by a small amount (1.11 Tg) during the period 2020–2030, when the water table declined while the beach increased, and then accelerated the expansion of construction land in the next 20 years. CS dropped significantly by 3.36 Tg to reach 545.36 Tg by 2050. In the SSP585 scenario, although a large area of water body and marshes was transformed into beaches, with the encroachment of cultivated land, woodland, and grassland by the expanding construction land, CS showed a consecutive decrease (6.41Tg), reaching 540.90Tg by 2050.

Figure 8 Contribution of LUCC's driving factors for each land use type in the study area



Cultivated land distribution mainly depends on distance from water bodies (10.5%), economic development (10.0%), and population density (9.5%). This is similar to the findings of previous studies (Huang et al., 2015; Tan et al., 2005). This could be attributable to the dependence of large areas of paddy fields in the region on surface water bodies for

cultivation. Also, population changes can affect the amount of food demanded while economic growth can also have an effect on agricultural patterns, which can affect the area of cultivated land (Sun et al., 2021). The spatial distribution of beaches depends mainly on annual rainfall (15.1%) and average annual temperature (13.5%).

SD model simulation results for land use areas in 2020 compared with the actual value

Land use	Cultivated land	Woodland	Grassland	Water body	Beach	Construction land	Marsh
Real value in 2020 (km²)	6876.43	8385.09	217.39	2125.48	820.65	665.43	324.90
Estimated value in 2020 (km²)	6878.50	8377.53	214.01	2065.00	851.99	655.58	345.97
Relative error (%)	0.03	−0.09	−1.55	−2.85	3.82	−1.48	6.48

Quantitative functions among variables were input into the SD model, and a 20-year simulation was conducted from 2000 to verify the accuracy. The outcome was that the relative errors for most land use types were within 5%.

Total CS and CS changes under the SSP126, SSP245, and SSP585 scenarios, 2020–2050

SSP-RCP Scenario	Total CS (Tg)	Total CS (Tg)	Total CS (Tg)	CS change (Tg)	CS change (Tg)
	2020	2030	2050	2020–2030	2030–2050
SSP126	547.61	547.38	548.08	−0.23	0.71
SSP245	547.61	548.72	545.36	1.11	−3.36
SSP585	547.61	547.31	540.90	−0.30	−6.41

To evaluate CS changes based on carbon density, future LUCC was fed into the InVEST model. The findings showed that the three scenarios' CS trends and spatial distributions varied, with SSP245 having the greatest CS by 2030. However, only under SSP126 did CS increase by 2050 compared with 2020.

Interaction mechanism between carbon emission and carbon sequestration in China

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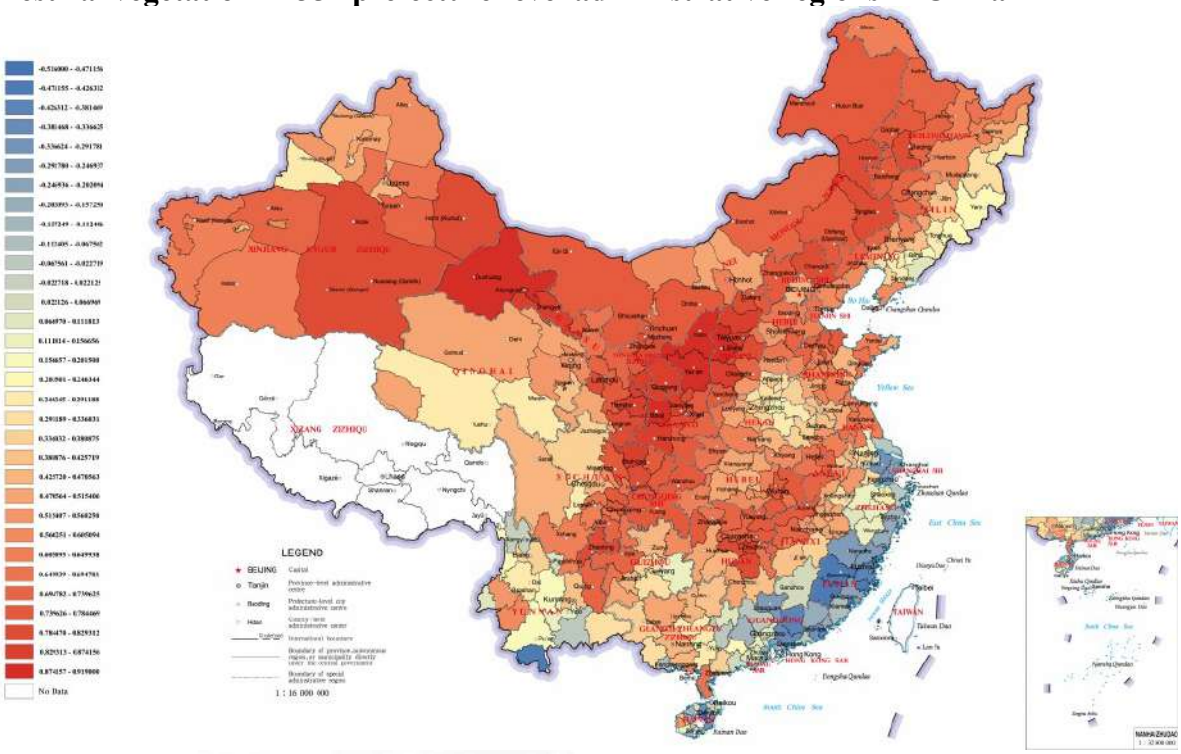
[Background] With the continuous deepening of urbanization, the natural ecological environment is constantly subjected to interference and encroachment by human activities, and the continuous increase of carbon emissions and the continuous weakening of the carbon sequestration capacity of ecosystems have resulted in an extremely unbalanced situation of atmospheric CO_2 content. [Objective] In order to cope with the global climate change and alleviate the uneven distribution of carbon emissions (CE) and terrestrial vegetation carbon sequestration (CS) in time and space, [Methods] This paper used Pearson coefficient as an index to measure the correlation between carbon emissions and terrestrial vegetation carbon sequestration for 352 prefecture-level administrative regions in China from 2000 to 2017. Combined with the geographical weighted regression (GWR) tool, we explored the tradeoff synergistic mechanism and driving factors of carbon emission and carbon sequestration by terrestrial vegetation. [Results] The results showed that: (1) Regional carbon emissions were significantly correlated with terrestrial vegetation carbon sequestration in most areas of China, and the tradeoff synergies showed obvious spatial differences; (2) Among them, CE and CS in 307 prefecture-level cities are positively correlated, showing a synergistic relationship. The spatial distribution of Pearson coefficient showed a significant aggregation feature, with its high value concentrated in most areas of Gansu, Shaanxi and Shanxi provinces, the border areas of Sichuan, Chongqing and Yunnan provinces, and the border areas of Hebei, Jiangxi and Hubei provinces. (3) 45 cities showed negative correlation, showing tradeoff relationship. These areas are mainly concentrated in the four provinces of Guangdong, Fujian, Zhejiang and Hainan along the southeast coast of China. The closer the city is to the coast, the lower the Pearson coefficient is; (4) The formation of the tradeoff coordination mechanism between CE and CS is determined by natural ecological factors and socio-economic factors; (5) In addition, we also found that the correlation and driving factors of carbon emissions and terrestrial vegetation carbon sequestration have obvious spatial spillover effects. [Conclusion/Discussion] Based on the above research results, we discussed the trade-offs and synergies between carbon emissions and carbon sequestration by terrestrial vegetation in China's prefecture-level cities and the reasons for their formation. It can be seen that to achieve the goal of reducing atmospheric CO_2, it is necessary to focus on a larger area than the prefecture-level cities and formulate the overall plan from a higher perspective. Based on this point of view, we put forward countermeasures for different regions and different types of cities, in order to provide basis for the subsequent zoning planning and construction of prefecture-level cities in China.

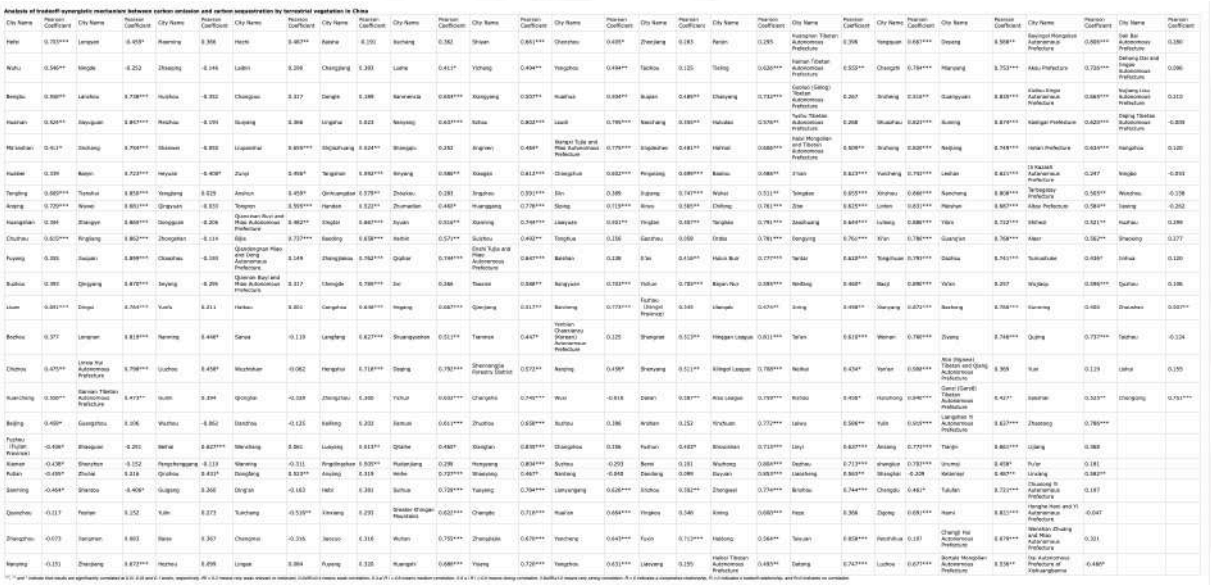
Keywords: Carbon Emissions, Carbon Sequestration, Spatial Spillover Effects, Synergistic, Tradeoff

Tradeoff synergistic mechanism between carbon emissions and carbon sequestration by terrestrial vegetation in 352 prefecture-level administrative regions in China



Pearson correlation analysis was performed using SPSS 27 software. The results were visualized by ARCGIS10.8

Analysis of tradeoff-synergistic mechanism between carbon emission and carbon sequestration by terrestrial vegetation in China



****, ** and * indicate that results are significantly correlated at 0.01,0.05 and 0.1 levels, respectively. |R| < 0.2 means very weak relevant or irrelevant, 0.2≤|R|<0.4 means weak correlation, 0.4 ≤| R | < 0.6 means medium correlation, 0.6 ≤ | R | < 0.8 means strong correlation, 0.8≤|R|≤1.0 means very strong correlation. R > 0 indicates a cooperative relationship, R < 0 indicates a tradeoff relationship, and R=0 indicates no correlation.*

Xylella, a landscape problem

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Starting in 2016, a bacterium called *xylella fastidiosa* started to desertify olive trees in Salento, in southern Italy, and to date no remedy has been found to stop the contagion. The European Union has imposed the eradication of every tree that is positive for the bacterium and the plants close to it, within a 100-metre radius, effectively proposing a desertification of the infected territory without addressing the issue of landscape protection. The local population firmly opposed this decision, preventing the eradication of the olive trees, even if they were dying, thus inaugurating a season of denied landscape, or rather *no-landscape*.
While such a proposal was certainly the most sensible one to stop the xylella's destructive race towards the rest of the continent, Europe did not consider how much the so-called 'olive grove' is associated with the image of Salento and how intimately connected the olive tree's features are to those of the inhabitants of the Terra d'Otranto.
Andrea Zanzotto wrote that 'saving the landscape of one's land is like saving its soul and that of its inhabitants'. Here, an attempt will be made to explain the irrational gesture of many young rebels and peasants not to apply European decisions by highlighting the essential role that the olive tree plays in the Salento landscape, understood both as a *landscape horizon* and as a *psychic horizon* within which the citizen forms and recognises himself and from which he cannot be eradicated. Firstly, there will be an analysis of the writings of Grand Tour travellers (English, French, German) who described this land, being struck by the incredible expanse of olive-grown fields and the imposing bulk of this centuries-old tree, which over the centuries has become an integral part of local history, economy and architecture, qualifying the Salento countryside itself as cultivated 'like a garden'. In a second moment, the paper will aim to highlight the ancestral significance that the olive tree has for the Salento land by poetically scrutinising the vegetation "grown without a drop of water". The olive tree, for the people of Salento, is an "olive tree with a human heart" in which "it groans an unparalleled effort to exist", a vegetal mirror of the Salento population that wants to "detach itself from the roots that bind it to the ground". The paper will therefore provide a critical comparison between the literary image handed down by travellers of the past and the present-day image of a landscape that seems to have lost its identity due to building speculation, the plundering of the land and a bacterium that has destroyed entire areas.

Keywords: Xylella, Olive, Salento, Desertification

A young girl takes refuge in an olive tree to protest against the felling of infected trees

Felling of olive trees in Salento infected by xylella bacteria

After the flooding: Living within a Mediterranean torrentscape

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[6]Department of Urban Management, Urban and Regional Planning, University of Thessaly, Volos, Greece, De-Centralised Administration of Thessaly and Central Greece, Volos, Greece

OBJECTIVE: This presentation heralds a 'Code Red' alert, highlighting the perilous state of the symbiotic relationships within the diachronic torrentscapes of Volos, a city built and expanding between the catchments of 3 torrents, namely: Krafsidonas, Anavros and Xerias. This interdisciplinary research endeavors to investigate the dynamic relationships along the riparian area of the Krafsidonas torrent within Volos' urban fabric, emphasizing the interconnectedness of torrent-bank communities and ecosystems with water flux.
Materials-METHODS: A diachronic diagrammatic mapping, or chrono-mapping, tracing the history of human interactions with, and interventions to, the Krafsidonas, within its catchment, serves as the research backbone. Additionally, the research explores the increasing fragility of vulnerable areas prone to flooding through the analysis of forecasted flood maps. Furthermore, the way the floodings affected the signifier ‘Krafsidonas’ within the imaginary of inhabitants shall be questioned through ethnographic fieldwork.
CASE: Following the double cataclysmic flood events that struck the city of Volos, Greece, on September 5th-6th and 25th-27th 2023, the prevalent media narrative attributed the ensuing disasters to the torrents themselves, which were frequently depicted as 'breaking': thus, unfairly vilifying the natural course of these waters. This dual catastrophe undeniably served as a dramatic awakening to the reality of climate collapse in the region of Thessaly. Various scenarios aimed at fortifying the city against future flood events are currently circulating, including discussions of 'climate crisis refugees', proposals for rerouting the Krafsidonas torrent away from urban areas, as well as discourses concerning the development of a more ‘resilient’, yet literally more robust, anti-flood infrastructure. Could these scenarios be categorized as expressions of either torrent avoidance or tendencies to exclude torrents from everyday life? The passage of time poses the question of whether further irreversible changes loom over Volos' torrent landscapes.
RESULTS: Through chrono-mapping key phases are delineated, such as the torrent's diversion according to the Volos port plan (1890), the establishment of industrial zones around the Krafsidonas banks, and the creation of the Nea Ionia riparian district, for Asia Minor refugees (1920s); also, key-events and practices, which signal modes of co-existence, like the solidarity of Nea Ionia community who annulled the overlapping and undergrounding of the

Krafsidonas under the planned Volos ring road in the 1980's-1990's, and the movement against the cutting of trees along the torrent course by active citizens, environmentalists, in Volos at present. Post-flood developments, including evidence of makeshift barricades to safeguard private properties and interviews with individuals affected by the flooding of the Krafsidonas, will also be traced and examined.
DISCUSSION: In contrast to exclusionary approaches to the torrentscape, the viewpoint espoused in this research advocates for the continued inclusion of torrents as 'eco-corridors' within the urban ecosystem, employing Nature-Based Solutions [N-B_S] and bolstering Blue & Green Infrastructure [G&B_I] networks. Ultimately, the research addresses how expressions of a more 'symbiotic' co-evolution of urban, social, and natural agents, including the torrent system, could be fostered through strategic planning and design interventions. Moreover, it discusses the degree of receptiveness of such discourse among communities affected by flooding in Volos.

Keywords: urban ecosystems, Mediterranean torrentscapes, climate crisis refugees, symbiotic co-evolution, chrono-mapping

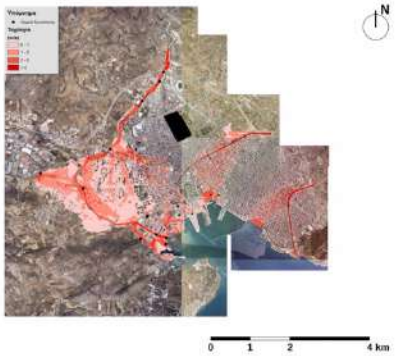
"welcome to FLOODED Volos", after the strorm "Daniel"

Image depicting the flooded areas around the centre of the city of Volos, in September 2023. Source: Newspaper "AVGI" [online version.] 8/9/2023. accessed at: https://www.avgi.gr/koinonia/460091_nero-tholo-kai-stagona-stagona-synehizontai-oi-kathiziseis on Friday, 1/2/2024, 13:33

photos of Kravsidonas torrent during the storm "Daniel", September 2023

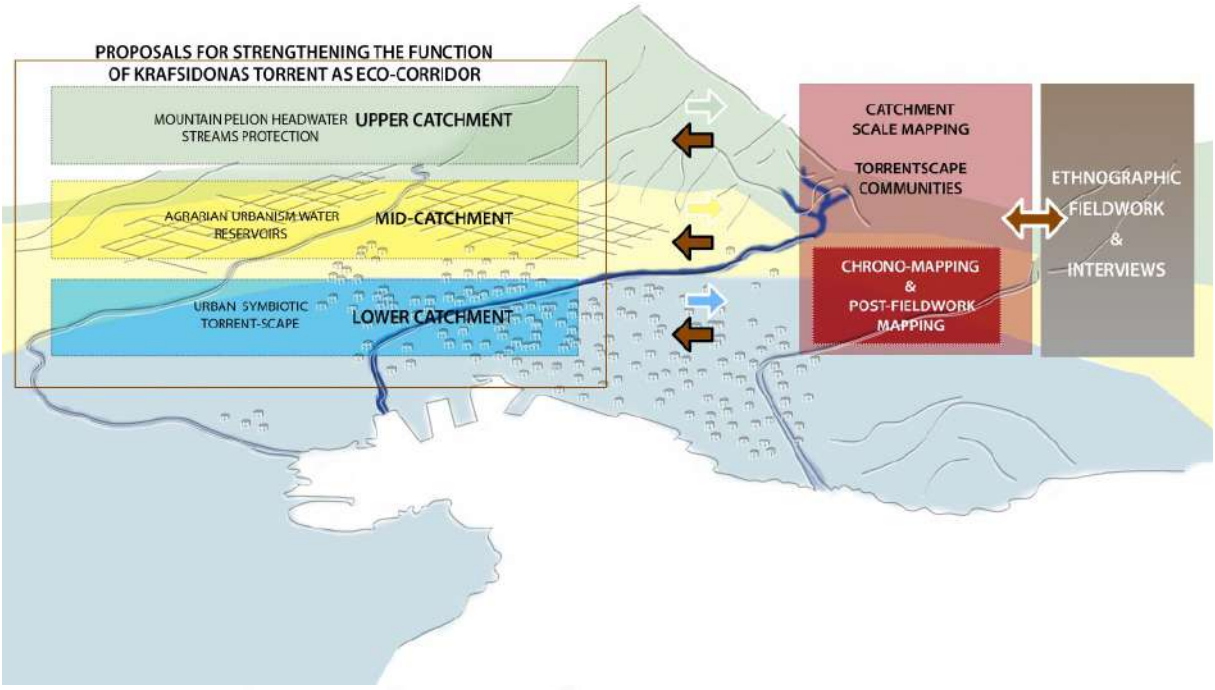
The area where the actual trainline bridge stands today, founded towards the end of the 19th century [1899] by the French engineer Quellenec, is depicted in the photo. It is the spot where the minimum diameter is left for the water flow within the Krafsidonas torrent-bed. This very bridge hindered the flow of great volumes of water, and caused the torrent water to overlap its deck, and flood the city. Source: online newspaper I-efimerida.gr Accesed on 16/2/2024, 13:50, at: https://www.iefimerida.gr/ellada/poli-kato-apo-nero-o-bolos-foto-binteo

Synthesis of 3 maps which speculate possible flooding events of the 3 torrents at the city of Volos, prior to the September 2023 flooding



Flood risk forecasting and speculation of affected areas, as calculated and depicted before the floods of Volos, concerning extreme events [based to pre climate-collapse facts] for an interval period of 1000 years. Composition-collage of 3 existing maps [one for each torrent] by co-author E.A. Diamantouli, based on the maps provided by the Ministry of Environment and Energy. Intensity of color depicts higher speeds of water. Source: Ministry of Environment and Energy, Greece https://floods.ypeka.gr/wp-content/uploads/2023/12/GR08_P05_T1.pdf

Torrentscapes, Volos: outline of research on Kravsidonas torrent



The methodology out;ine followed within this research, as formulated for the presentation at the60th IFLA world conference, is depicted in this scheme. Credits: co-authors E.Dimitrakopoulou and A.Kouzoupi

Identifying suitable sites for drought tolerant trees in urban areas

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[4]School of Fine Arts Department of Landscape Architecture

The most important criterion for selecting plant species to be used in landscaping in urban areas or for applications such as renewal of existing vegetation is that these plants have proven their success in terms of adaptation to climate change and drought resistance. In this context; It has become a necessity for today's cities to have a strategic plan explaining the local constraints and guiding factors that will guide designers and decision makers in determining the plant types to be used in urban green areas, and a selection guide accordingly.

The aim of this study is to reveal the factors that will be included in a multi-criteria analysis method that will guide decision makers in species selection in order to increase the effect of plants on urban resilience, and the principles of working with numerical data in the process of guiding the decision maker of these factors, with a GIS supported approach.

The factor analysis matrix we developed within the method proposal we call "Plant Suitability Analysis: PSA"; It offers the opportunity to evaluate various factors that affect and are affected by plants ecologically and spatially in urban areas for different species on an urban scale. The factors included in the matrix can be tested by assigning importance levels according to different situations and conditions, such as the ecological characteristics of the place where the application will be made, its size, and the ecological demands of the selected species. The data set regarding the plant's habitat requirements supporting the created matrix has been structured by separating it into main and sub-factors to work with the support of Geographic Information Systems. The suitability values and impact percentages of each factor were created in a table (with 11 factors) so that a multifaceted decision analysis can be developed. The active factors in the matrix created with the "Weighted Overlay" and "Map algebra" tools running in the GIS environment are prioritized by assigning attribute information and applying the Analytic Hierarchy Process (AHP) method. With the help of these data and matrix, suitability maps at different scales can be produced for urban spaces determined.

In order to show how this analysis method works; Some details were stated to be high in specific drought data; Selected sample of drought tolerant trees plant species; An application was made with Cercis siliquastrum in Istanbul. In this article, the findings obtained as a result of this study will be conveyed and the usability and potential of the method in creating vegetative master plans in the space will be tried to be revealed.

Keywords: PSA, drought tolerant trees, Ecological Planning, GIS, AHP

A knowledge framework towards hypoallergenic urban residential environment

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Background
Research has shown that pollen allergic diseases are increasing in prevalence with the increase of urbanization. Besides human self-reasons, an important environmental causation is that urban green space brings more allergenic pollens. Vegetation within small and medium scales is closely related to the composition of air pollen, which means that it's possible to build a hypoallergenic place in certain areas of the city.
Objectives
However, a hypoallergenic residential environment is not explicitly analyzed in the pollen allergy related literature, and only some on the characteristics of allergenic plants and spatial allergenicity assessment. To address this gap, this study presents a knowledge framework towards hypoallergenic urban residential environment.
Methodology
This framework was developed by literature review and a case study of residential area renewal in a typical Chinese city. The case data includes remote sensing images, street view photos, and field research.
Result
We build a framework including risk source investigation, risk mapping, risk monitoring and correction, and risk response strategies. We argue that by applying this typical paradigm towards hypoallergenic urban block, it's possible to create solutions for a healthier and more sustainable city.
Discussion
Considering the tree pollen allergy risk characteristics of the urban residential environment, theoretically, we can deal with it from two aspects: risk source control and risk exposure reduction. Regarding the sources of risk, measures based on vegetation renewal and management are theoretically the most direct and effective means. But for urban built-up areas, it's very difficult. In terms of reducing risk exposure, we can reduce exposure opportunities in both time and space by guiding human behavior. And it requires technical support from risk assessment, risk prediction, and risk warning.
CONCLUSION: In summary, the distribution of air pollen in the microscale of urban block is not uniform, and there are significant differences in different regions. Building a allergenic risk assessment system based on pollen monitoring is currently the most effective research direction. In order to create healthier and more sustainable cities, further efforts should be made to establish a hypoallergenic pattern at multiple scales across regions, cities, blocks, and residential buildings.

Keywords: Hypoallergenic environment, urban residential environment, allergic risk, urban plants, risk mapping

Post-Disaster Design of the Yongding River Basin in Beijing

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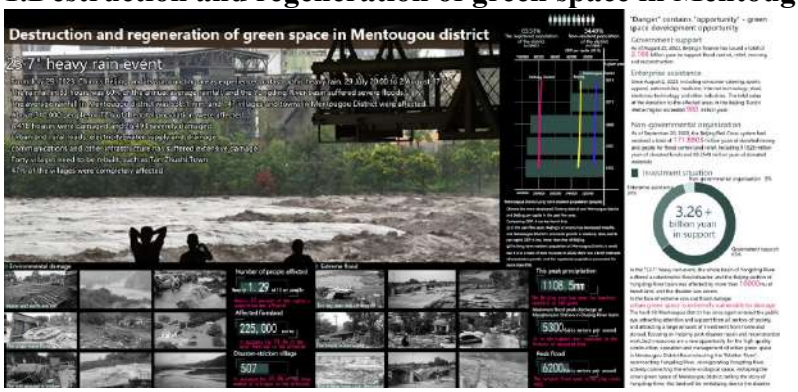
Beijing Forestry University

From July 29 to August 2, 2023, Beijing suffered a 140-year rainstorm disaster, and the Yongding River Basin in southwestern Beijing was severely affected, with the peak flow of Yongding River at Lugouqiao Station rising from 1,000 m3/s to a peak of 4,650 m3/s in only 2 hours, the largest flood peak since 1925. After being continuously flushed for 83h, the green space along the Yongding River was severely damaged. The affected area of farmland exceeded 15,000 hectares, and the flood water carried no less than 360,000 m3 of sediment that overtopped and retained the green space along the river, severely damaging the ecological and recreational service functions of the green space along the river, and destroying the biodiversity.

Beijing Forestry University was invited by the Beijing Water Authority to carry out the planning and design of post-disaster recovery and upgrading. The design focuses on the following three items: (1) Resilient space construction based on water security. In response to river scouring and sediment deposition in the urban section of the plain, a combination of rigid and elastic measures is adopted to improve the resilience of the green space, and traditional ecological wisdom is applied to imitate the principle of Dujiangyan flood diversion and sediment discharge, realizing automatic water diversion from the green space within the embankment to reduce sediment input and siltation in the river. In response to the irregular channel morphology, erratic alignment and lack of a distinct mainstream in the countryside section of the plain, water is passed through to restore natural river ecosystems and flooding is utilized to reshape river habitats. (2) Habitat area construction based on biodiversity enhancement. Combining Guidos Toolbox and InVEST model to analyze data on biodiversity maintenance, habitat quality and ecological corridors in the Yongding River Basin, the current situation of 56 hectares of areas to be maintained and improved as well as 9 ecological breakpoints have been identified, so as to targeted maintenance of the damaged areas to systematically carry out ecological restoration. (3) Construction of green space system in the plain section of the Yongding River. Comprehensive deployment and upgrading of regional ecological protection, green space construction, cultural inheritance and industrial innovation in the plain section of the Yongding River, building a slow-moving network based on connected ecological corridors, creating an open and shared green space system with vitality and safety, and forming a complete service system of green space facilities to realize the long-term vitality of the green engine.

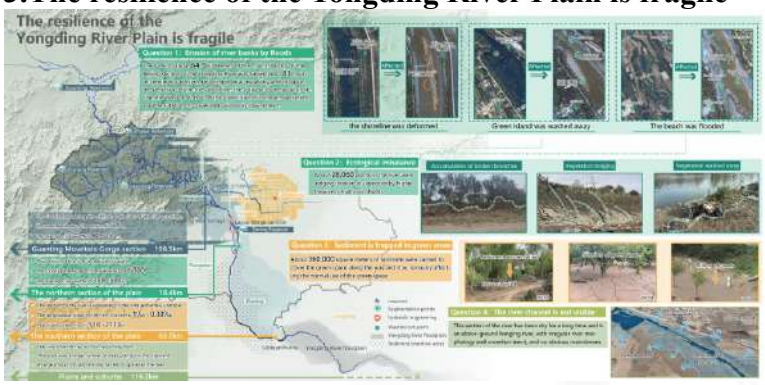
Keywords: climate change, blue-green infrastructure, disaster response, resilience enhancement, biodiversity

1.Destruction and regeneration of green space in Mentougou district



2.Restart Mencheng Lake Recognise the venue

3.The resilience of the Yongding River Plain is fragile



4.Eco-demonstration section

Human impact on ecosystems: Human-based landscape vulnerability codes in Istanbul

Sevgi Gormus, Serhat Cengiz
Department of Landscape Architecture, Faculty of Fine Art and Design, Inonu University, Malatya, Turkey

Ecosystems are facing dramatic degradation worldwide, making optimal management of ecosystems an urgent issue for both science and practice, given limited resources for conservation. The main reason why it is an urgent issue is that with the increase in human demand for the services of ecosystems, the processes and functions of ecosystems are being disrupted and this makes it difficult for ecosystems to adapt to change. Since the interruption of the process and function in an ecosystem causes the destruction of the interaction between ecosystems, on the one hand, the demanded service cannot be produced, and on the other hand, the landscape, which is a whole of ecosystems, considerably get reduce its ability to adapt to the foreseen change, which is becoming faster and faster. As ecosystems are essentially a complex network of living organisms interconnected through relationships such as feeding, reproduction and displacement. Therefore, the interaction between the process and function of the ecosystem and the service it provides is very high. The level and direction of interaction between process, function and service indicate to us the resilience or vulnerability of the landscape. Therefore, in this study, the human impact (HI) on the interaction of ecosystem services (ES) with ecosystem processes (EP) and functions (EF), and on the codes of change in the interaction patterns and resilience tendency of the landscape is evaluated through the city of Istanbul. Based on the Istanbul landscape pattern (LP) obtained using multi-temporal satellite imagery covering the period between 1984-2020, landscape vulnerability (LV) codes resulting mainly from human impact within the scope of climate change, land use/land cover change, (LULC) urban growth, and habitat fragmentation were analyzed. Between these years, urban open green areas and forest areas in Istanbul decreased by 321.5 km2 and transformed into built-up areas. Between 1984 and 2020, the average surface temperature in the city increased by 7 °C and the NPP values changed in the negative trend. In 2002, an annual average of 0.490 tons of carbon was stored in 1 m2 of urban open green areas and forest areas, while this ratio was calculated as 0.418 tons in 2020. While the urban footprint in Istanbul was 37.7% in 1984, it has reached 51.8% in 2020. These rates demonstrate that the conditions for habitat fragmentation are being accelerated. Since land transitions are condensed on agricultural areas and forest areas, the nutrition cycle, which is the basic relationship between living things in the ecosystem, has been damaged. The increase in impervious surfaces in the city, the location of industrial areas and the poor management of pollution factors cause the disruption of the water cycle, which has the most important positive effect on the resilience of the landscape. We hope that this study will make a contribution to the management of optimal planning decisions to enhance the resilience of the process, function and service connections between the ecosystems of Istanbul.

Keywords: landscape resilience, landscape vulnerability, ecological risk, human impact, Istanbul

Landscape Design for Earthquake Resistant Cities: Bakırköy Example

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The swift urbanization process in Turkey, propelled notably by urban migration, has led to the metamorphosis of unplanned urban areas into zones of urban decay. The concomitant rapid urbanization has resulted in the degradation of urban open and green spaces, constricting the per capita green space amidst escalating population density. Furthermore, the inadequacy of recognizing the pivotal role of open-green spaces and urban infrastructure in poorly developed urban areas has emerged as a pressing issue. The seismic event of February 6th, centered on Kahramanmaraş, served as a stark reminder of the criticality of urban open and green spaces, shedding light on their qualitative and quantitative deficiencies.In response to these observations, two central inquiries have crystallized, constituting the foundational framework of this inquiry: Are we undertaking sufficient planning to alleviate the deleterious impacts of post-disaster scenarios? How can we seamlessly integrate open and green spaces into the urban landscape, considering their functionality and importance during disasters, and to what extent are current designs efficacious in augmenting disaster resilience? This study endeavors to address these queries and discern the functions that urban open and green spaces in the earthquake-prone Istanbul-Bakırköy district would shoulder during and subsequent to a seismic event. Additionally, the research strives to delineate urban open and green spaces available for the populace post-disaster and assess their adequacy concerning gathering, evacuation, and temporary shelter functions, employing a comprehensive approach encompassing literature review, observation, and analytical methodologies. Centering on Bakırköy in Istanbul, positioned on the European side of the city, the chosen study area is characterized by its location in a primary earthquake zone and susceptibility to tsunamis post-seismic activity. Moreover, Bakırköy's status as one of Istanbul's oldest districts contributes to its heightened seismic vulnerability due to its aging building stock. Pertinent information related to the study area includes the existing open and green space assets, design decisions concerning these spaces, and an open and green space design diagram capable of accommodating post-disaster evacuation and temporary shelter functions. The outcomes underscore the inadequacy of prevailing design decisions in terms of earthquake resilience. The per capita green space ratio experiences a substantial decline owing to potential building collapses, roadway damage, and the aftermath of post-earthquake tsunamis. The findings reveal that the usability of urban open and green spaces falls considerably short of the initial projections based on existing design decisions. In light of these results, and in the context of deliberating the role of urban open and green spaces post-disaster, a proposal design is formulated for a selected area in the Bakırköy district, adhering to the earthquake-resistant design paradigm.

Keywords: Disaster, disaster management, earthquake resistant, resilient city.

"A tool combating climate change: native plants and utilization potentials"

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Climate change is caused by global warming due to the increase in greenhouse gas emissions as a result of anthropogenic activities. Human activities such as industrialization, use of fossil fuels, transportation, deforestation, decrease of green areas, unconscious agriculture and agricultural irrigation can be said to be the main causes of climate change. The main source of greenhouse gas emissions, which constitute the main cause of global warming, is the cities where human activities are the highest. Especially in metropolitan cities where these activities are intensive, problems such as global warming, drought, desertification, erosion, flood disasters, fires and food crisis cause great damage to cities. Today's climate change crisis is one of the biggest problems of today and the next century. For this reason, it is extremely important to develop nature-based solutions in the process of combating climate change, especially in cities. One of the most important nature-based solutions is the planning and implementation of blue-green infrastructure and water management.

While the climate crisis is dragging the world into a thirsty and arid future, the presence, quality and quantity of green areas have an important role in the planning of livable cities. Therefore, the selection of plant species used in green areas is also of critical importance. For this purpose, especially in the landscape designs of metropoliten cities, the selection of natural plants that require less maintenance or even no maintenance, are compatible with the region they live in, save water and at the same time provide aesthetic appearance to the cities with their long flowering period gains importance. In this sense, Turkey is one of the lucky countries where about 11,000 flowering and ferning plant species grow naturally and about one third (34.4%) of its flora consists of endemic species. Therefore, in this country with such a rich plant diversity, it is necessary to investigate the usability of these plants in urban landscapes.

In this context, this article aims to determine the potential of some natural plants to be used in planting designs. In this context, within the study, a survey was carried out according to the random sampling method and 282 participants were interviewed the survey. Within the scope of the survey, there were questions about the awareness of plant existence, the reasons for their preference in plant design and their potential for use. According to the results of the survey, it was revealed that visual-aesthetic values were at the forefront for the participants when choosing plants, the ecological values of the plants were put into the second plan, and the use of natural plants, which are more prominent with their leaf structures, was preferred with a value above average.

According to the results of the research, it is thought that it is necessary to increase ecological, economic and social awareness in planning and design, especially in the process of climate change. Explaining the importance of the use of natural plants in cities and ensuring their preferability in landscapes will be an important step in combating climate change.

Keywords: Climate Change, Native plants, Urban Landscape, Planting Design, User Preferences.

Prioritizing Lakescape site for NbS Implementation Using AI tool

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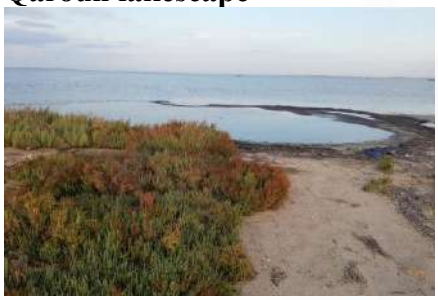
Water quality is one of the most pressing issues today around the world, as the need for mitigation actions is increasing to face climate changes and the growing human demand for water. Lake Qaroun is one of the main sources of water that was effected by the agriculture and sewage drainage, which resulted in the severe degradation of water quality and consequently, an unbalanced ecological state of the surrounding environment. this study focuses on the implementation of natural based solutions to help upgrade the quality of drainage water before reaching the lake body, Because of the complex interchanged environment of the lakescape, an AI tool is suggested to prioritize site for NbS application considering economic and environmental parameters related to the lake context and sustainability indicators to find the optimum site and achieve the best results.

Keywords: Lake Qaroun, AI, NbS, Water quality

lake Qaroun

the case study is lake Qaroun, located in Fayoum governorate, Egypt

Qaroun lakescape



Evolution, Movement of Urban Voids in Antakya:From Existence to Nothingness

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With its self-culture, heterogeneous structure and active historical living spaces that have been blended and kneaded for centuries, the city of Antakya keeps all the information about its common line hidden in its own unique social and spatial voids. However, contrary to often seen in today's cities, the multifaceted, highly adaptable and especially meaning-producing structure of the voids (such as courtyard, street, square, shore etc.) that shape the city in Antakya is a clear indication that the issue cannot be reduced to just a urban solids and voids issue. These “Meaningful Voids” which formed the ancient and contemporary urban life model of the local people until the earthquake that destroyed the city last year, have evolved into large, deep voids that have emerged involuntarily for today. The study aims to evaluate the impact of the earthquake through the changes in the structures of historical streets and urban voids, which are elements that bear the traces of civilizations. In this respect, at the center of this study is the concept of emptiness, which Parmenides defines as “Being” and Einstein defines as “A being that is beyond nothingness and has mass”. The data of the project, which was produced within the framework of “Antakya Köprübaşı City Square and Its Surrounding Urban Design Project Competition” and was deemed worthy of the Purchase award by the jury members, constitutes the basic basis of the research. The study is important in terms of discussing on an urban scale how the meaningful voids determined by evaluating the formation and development stages of the city during the project phase turned into nothingness after the earthquake. In this context, the aim is to investigate the effects of the earthquake on environmental degradation through post disaster situation assessment and to put forward suggestions that will make the voids a part of daily urban experiences again. As a result of the study, a number of strategic tools have been developed that are expected to transform “Urban Nothingness into Existence”.

Keywords: Antakya, Urban voids, Earthquake, Existence, Nothingness

Call for the Golden Horn: Water Resilience Design Investigation

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Numerous studies have shown that our planet is warming much faster than the pre-industrial period. While there was around 0.5°C increase in the average temperature between 1880-1980, approximately 1.5°C degrees increase was recorded in the last 40 years. The warming of the earth, which is largely due to greenhouse gas emissions and aerosol effects, causes many local and global catastrophic disasters. One of the major results on the planet is the accelerating sea level rise. While around 20cm rise in sea level had happened between 1920-2020, today projections-studies estimate that sea level can reach up to 100cm in 2100. The acceleration in sea level rise poses threats for the coastal cities such as Istanbul where different coastal landscape typologies exist.

The coast of the Golden Horn, Istanbul, which has critical roles as a backbone of Istanbul's blue-green system, will also be partially affected by the rise in sea level in 2100 and will be completely submerged according to the predictions of 2200 and 2300. The Golden Horn, which has an extremely important role in flow accumulation due to its valley morphology, also differs from many settlements with its urban pattern containing many historical and cultural values. The study aims to propose a strategic method based on ecological approaches by utilizing sea level rise scenarios while preserving historical values in an estuary morphology that is rich in historical and cultural terms and dramatically urbanized.. This study investigates water-resilience design strategies in the perspective of Water Sensitive Urban Design (WSUD) and Adapting Cities Sea Level Rise through open sources and literature review on the case studies. Historical maps, aerial photographs, archives of publicly available competition projects and ArcMap (GIS) were used to analyze the data. As a conclusion, different coastal section typologies were proposed for Golden Horn as a sea level adaptation mechanism at spatial level with an emphasis on historical/ cultural values. This study provides a lens to understand how the effects of sea level rise can be mitigated by applying different landscape-based design tactics for the sea-land intersection while protecting the existing historical and cultural values embedded within the urban matrix.

Keywords: water resillience, sea level rise, flood simulation scenario, the Golden Horn

Monitoring Land Use/Land Cover (LULC) Changes in Çankaya, Ankara

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In today's world, industry and industrialisation, technological and economic developments and the rapidly increasing world population are rapidly changing and transforming the environments we live in. This situation is particularly evident in developed and developing countries. While these changes and transformations are taking place, the environments in which we live may be struggling with many environmental problems. This reveals the necessity and importance of the right urban interventions. In this context, monitoring of land use/land cover (LULC) changes is an important requirement to effectively address the problems and make the right decisions. Ankara, the capital of Türkiye, ranks 2nd among the most populated cities in the country. Especially in recent years, the city has frequently been on the agenda in terms of urban transformation and urban construction. In this study, LULC changes in Çankaya district of Ankara were monitored. In this context, the Urban Atlas data provided in the Copernicus Land Monitoring Service data portal was used. In the study, the data covering the years 2012 and 2018 were processed in GIS (Geographic Information Systems) environment and the changes between these years were evaluated. The results showed that there were land cover changes in Çankaya between 2012 and 2018. It was determined that construction sites increased by 444%, isolated structures increased by 53%, mineral extraction and dump sites increased by 17%, discontinuous very low density urban fabric increased by 15%, while land without current use decreased by 14%, arable land (annual crops) decreased by 4%, herbaceous vegetation associations (natural grassland, moors...) decreased by 3%, pastures decreased by 3%. It has been determined that this increase in construction areas has been largely realised through the transformation of arable land and areas with herbaceous vegetation. This study shows how resources such as urban atlases can be used effectively to make the right decisions about land use and planning strategies in rapidly changing and developing urban areas. Within the scope of the study, suggestions for future studies on urban planning are presented.

Keywords: Urban atlas, Land use, Land cover, Planning, Çankaya

Exploring Biophilic Nighttime Green Space Lighting Using Volunteered Geographic Information

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With the rapid development of the nocturnal economy, the number and duration of artificial lighting facilities are continuously increasing. Artificial night lighting breaks the temporal and spatial constraints of darkness, providing convenience for human nocturnal activities. However, the adverse effects of these artificial light sources on biological entities have been confirmed by relevant research. Urban green spaces constitute the main habitat for urban wildlife. The artificial lighting at night in urban green spaces disrupts the biological circadian rhythms, further exacerbating the pressure on urban ecosystems. Regulating and controlling the extent of artificial lighting in urban green spaces has become a crucial issue, aiming to create a comfortable lighting environment for humans while minimizing the impact on the ecosystem. Initially, the study identifies the main types and timings of nocturnal activities among urban populations through analyzing text information extracted from social media apps. Subsequently, using the ArcGIS platform and urban environmental data, heat maps of nocturnal activity frequencies for different time periods were constructed. Finally, these data were mapped onto the urban green space lighting map, and the optimal pathways for green space lighting activities were explored based on a supply-demand coordination model. The results present a lighting supply and demand relationship map of different urban green space areas and resident activities. These findings provide a theoretical basis for guiding the type and duration of artificial lighting in urban green spaces, facilitating the optimization of lighting arrangements within these areas. The goal is to offer artificial lighting services to residents with the least biological disturbance and the most energy-efficient lighting solutions.

Keywords: Artificial light at night; Urban nocturnal environment; Urban ecological environment; Biological rhythms; Lighting pathways

Campus Climate Effects on Student Well-being: Mapping Heat Resilience

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Climate change alters the quality of life (QOL) and related circumstances, including access to goods and services like clean air, food, and open spaces (Adger et al., 2022). The impacts of climate change on people's health and well-being vary across cultural, ecological, and social contexts (Adger et al., 2022). This also applies to students on higher education campuses, where QOL is a composite of physical and psychological health, and relationships with their surroundings (WHO, 1996; Gulwadi et al., 2019). The student experiences on campuses are at least four years in duration and filled with intentional, structured/unstructured, learning-related encounters with campus environments that can cause and/or alleviate short/long-term stress. There is also increasing evidence that students are among the groups most vulnerable to feelings of depression and anxiety from experiencing climate impacts, such as increasing heat and temperature, as well as living with risk and adaptation interventions related to climate change, including their perceptions of threats to life and personal safety (Baker, 2021). In addition to worsening conditions such as asthma, hypertension, diabetes, and cardiovascular disease (Cueto, 2022), extreme heat also negatively affects mental health. University students' mental wellbeing is a pressing issue, necessitating consideration of heat stress and environmental features to counter extreme temperatures. Research indicates a connection between increasing heat and elevated suicide risk and hospitalizations for mood disorders, attributed to limited access to cooler outdoor areas (Horton, 2018; Wang et al., 2014).

Outdoor space design is vital for community well-being, including campus students, paralleling the importance of indoor spaces. Spending time in greenspace is positively associated with nature connectedness and students' healthy behaviors. This study explores the potential impact of extreme heat of outdoor campus spaces on student well-being hypothesizing that psychological factors are also a function of exposure to extreme climatic conditions driven by environmental attributes in outdoor open spaces (e.g. presence or exclusion of tree canopies, vegetated green areas, pergolas, etc.). Conducted on a university campus in the US, it aims to evaluate patterns of surface temperatures through heat maps, analyze well-being indicators, and create maps correlating students' experiences with outdoor spaces and heat patterns. Using a mixed methods approach, the study includes walking interviews to collect in-depth qualitative data about the relationship between students' experience on campus outdoors, including their perceptions of open spaces, greenness, restrictiveness, and quality of life in association with heat factors. Through the use of geotagged mapping apps, the study gathers real-time feedback on key outdoor spaces, enhancing understanding of students' experiences and preferences.

Conclusively, this research highlights the critical role of student quality of life on campuses in the face of climate-induced challenges. Examining the intricate interplay between

environmental shifts and human experiences, the study unveils the rising heat impact on students' well-being. It offers valuable insights for enhancing heat resilience and fostering a sustainable campus environment. This research contributes to understanding the complex link between climate change and student welfare, paving the way for transformative interventions.

Keywords: climate change, student wellbeing, campus environment, outdoor spaces, heat resilience.

Analyzing 'Code:Red' Theme in Turkish Postgraduate Theses

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The Earth is facing extraordinary changes, signaling a state of emergency encapsulated in the theme 'Code:Red'. Code:Red emphasizes the urgent need to deal with environmental crises, which are causing serious damage to land, air, and water ecosystems, threatening all living things and their homes. Climate change and disasters are making these problems worse, affecting people's lives, changing how we use land, encroaching on habitats, and leading to the extinction of species and wildlife crimes.

This paper aims to understand how widely those urgencies are studied in Turkish Landscape Architecture postgraduate education field. This paper focuses on analyzing the extent to which the keywords of the 'Code:Red' theme have been addressed in postgraduate theses in Turkey, with a specific emphasis on the field of landscape architecture. The aim is to identify which topics within this theme have been widely explored by landscape architects, as well as to investigate potential interdisciplinary collaborations between landscape architecture and other fields. Furthermore, the paper examines whether there has been an increase or decrease in research activity on these topics over the years.

To achieve this, we conducted a comprehensive analysis of the YÖK Thesis Database, which encompasses postgraduate theses from across Türkiye. By examining the content of these theses, we aim to provide insights into the research trends within the Turkish academic landscape and identify areas for further exploration and collaboration in addressing environmental challenges.

Keywords: code-red, postgraduate theses, Türkiye

Planning of Bicycle Station Design in Terms of Urban Mobility

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Climate change is one of the foremost considerations that must be evaluated at every stage of landscape planning and design decisions today. Particularly in cities experiencing significant climatic variations, ecological design approaches and their integration into urban landscapes are essential. Simultaneously, policymakers, particularly within the European Union, are working on transitioning transportation towards more environmentally friendly and sustainable directions. Solutions are also being sought to enhance the quality of life in cities by promoting active mobility solutions such as walking and cycling.

In this article, the bicycle station designs developed in a pilot project in the Aksaray province, concerning the aforementioned topic of "urban mobility," and their effects on increasing bicycle usage are explained. In the study, surveys and interviews were conducted with athletes affiliated with the Federation and amateur cyclists in the Aksaray province. Designs were considered based on criteria such as "user," "infrastructure," and "bicycle network," aiming to select suitable locations for bicycle stations (or parking facilities), drawing on the literature. Original design modules utilizing renewable energy and capable of meeting the needs of various types of bicycles were developed. GIS and multi-criteria decision-making methods were combined to determine the locations of bicycle stations. Seven types of designs, serving as part of a route and simultaneously as components of an ecological tourism concept, were placed in different locations across the provincial scale and mapped. Through the integration of rural-urban transportation networks, bicycle networks can contribute to the emergence of sustainable modes of transportation, fostering better competition.

In addition to the benefits of integrating ecological designs into urban and rural landscapes, such as environmental conservation and raising awareness, this study also conceptualizes how an uninterrupted, environmentally friendly, and alternative transportation system can enhance local quality of life at the provincial scale. Evaluating characteristics like service quality, parking facilities, geographical location, and accessibility features alongside operational performance is crucial for practical results. This research aims to provide a comprehensive systematization for station siting issues, criteria, and techniques by attempting to determine the current state of implementation. Designing or expanding different bicycle-sharing systems at the urban scale, supporting bicycle stations through infrastructure, has yielded gains supportive of urban mobility by solving a complex spatial problem.

Keywords: Bicycle station, Urban mobility, Sustainable design, GIS, Bicycle route

Questioning Landscape Architecture-Planet Relationship -In Today's Multiple Crises/Uncertainty Environment-

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The 'Code Red', which constitutes the theme of the IFLA World Congress 2024, signifies the multiple crises/uncertainty resulting from environmental problems at the global-local scale continuum. In his ground-breaking book 'Collapse', Jared Diamond examines the collapse or survival narratives of various civilizations, which were then exposed to environmental crises and later to the ecological/social/economic/political turbulences. Today's collapse story at planetary scale presents a new situation for the future of life and humanity, in which climate change effects and Covid-19 account for visible face of this global catastrophe.

Hegemonic economic and political systems shape the course of the chaotic world. Unless questioning a paradigm shift against these systems, our civilization has proven ineffective in challenging these multiple crises/uncertainty. Rather than approaching the current situation through stereotyped codes/tools, this paper looks into a paradigm shift relying upon two interrelated axes below;

• In the face of the 1929 world economic crisis, the track/struggle of the United States and the Young Republic of Turkey served as a laboratory in grappling with multiple crises (of 1920s and today).

• Landscape architecture (and allied professions) should envision the present/future form of the planet and life on it. The planet itself becomes the common ground of landscape (architecture) in this context.

During the 1929 world crisis, the United States attempted to overcome the era of multiple crises/uncertainty by implementing the 'New Deal' program, focusing on public policies/investments, and investing in large projects/infrastructures such as metropolitan and regional parks in which landscape architects were then employed. Today, the concept of 'Green New Deal Superstudio', guided by landscape architecture-based approach leads the way in developing new life scenarios against 'code red' conditions at both national and global levels.

In the 1920s and 1930s, the Republic of Turkey, under the leadership of Kemal Atatürk endeavored to spread development across the country through industry, agriculture, urbanization, transportation and infrastructure investments in order to cope with existing challenges. Distributing/sharing resources fairly and equitably across the country, the paradigm shift foregrounded civilization, self-sufficiency, production and public life/space in rural and urban spheres. Through the multi-layered development scheme, the Anatolian geography, under the identity of the Republic of Turkey, has been designed accounting the complex, but unifying nature of it. At the intersection of the east-west, and north-south axes, it has intermingled different dynamics across Anatolia to build up the country just like landscape architecture, which is also at the intersection of nature-culture-art. Therefore, the establishment of the Republic of Turkey is a laboratory/synthesis in addressing both the

current period and the nature of landscape architecture.

The experiences of both the United States and the Young Republic of Turkey present a new roadmap for the world and countries in the face of today's multiple crises/uncertainty. Hence, landscape architecture, based on the reality of 'landscape' and experiences of these countries should focus on designing the future of the planet as a "life+scape designer". In sum, the landscape architecture-planet relationship within a new paradigm will be formulated in a thought map encompassing all these relationships.

Keywords: Multiple Crises/Uncertainty, Landscape based approach, Landscape Architecture-Planet relationship

Way Beyond Bigness

Derek Hoeferlin

Way Beyond Bigness is a design-research project that studies the Mekong, Mississippi and Rhine river basins, with particular focus on multi-scaled, water-based infrastructural transformation. The book proposes a simple, adaptive framework that utilizes a three-part, integrative design-research methodology, structured as: Appreciate + Analyze, Speculate + Synthesize, and Collaborate + Catalyze. To do such, Way Beyond Bigness realigns watersheds and architecture across multiple scales (sites to river basins), disciplines (ecologists to economists), narratives (hyperboles to pragmatics), and venues (academics to professionals), defined as Watershed Architecture. The research critiques and recasts Oxford Dictionary's two very different definitions for a "watershed": 1) "An area or ridge of land that separates waters flowing to different rivers, basins, or seas" and 2) "An event or period marking a turning point in a situation in a course of action or state of affairs" and its two very different definitions for "architecture": 1) "The art or practice of designing and constructing buildings" and 2) "the complex or carefully designed structure of something." The book highlights the author's comprehensive work of over more than a decade, including in depth field research across the Mekong, Mississippi and Rhine, along with a diverse body of academic and multi-disciplinary professional collaborations and contributions, ranging from the speculative to the community-based.

Keywords: watershed, architecture, landscape

The landscape of the city once again February 6

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As known that Turkey is an earthquake country. It is located on the most geologically active earthquake zone.
According to official figures, more than 50 thousand people lost their lives in the Maraş earthquakes that took place on February 6, 2023. According to official statements, 50 thousand 783 people lost their lives and 107,204 people were injured in the earthquakes that affected a wide geography and 11 provinces. According to the statements of the Ministry of Environment, Urbanization and Climate Change, there are 36 thousand 932 people in the region, including 13 thousand 883 in Hatay, 7 thousand 295 in Kahramanmaras, 5 thousand 826 in Adiyaman, 4 thousand 197 in Malatya and 3 thousand 805 in Gaziantep. The building collapsed during the earthquake. 311 thousand buildings, consisting of a total of 872 thousand independent sections, became unusable due to the damage they received.

The aim of the study to be carried out is to examine the studies on the re-establishment of Hatay, where the devastating effects of the earthquake were intensely experienced, and to examine it in the context of Landscape Urbanism after examining all landscape layers. During the rezoning process, answers will be sought regarding ownership, the propositions of local administrative authorities regarding the legal and administrative framework, and whether these propositions can be related to the concept of "Landscape Urbanism".

Keywords: eartquake, landscape, urbanism, 6 february, hatay

Landscape Architecture Accreditation in a Code Red Era: Comparative Perspectives

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Landscape architecture accreditation plays an important role in ensuring the quality and relevance of landscape architecture education. As the issues of the contemporary world continue to evolve, so do the standards of accreditation. For instance, in response to recent challenges in the United States, the Landscape Architectural Accreditation Board (LAAB) expanded its Professional Curriculum Standards to incorporate *diversity* and *landscape performance* within the Skills and Competencies section (LAAB, 2019). Our research analyzes current landscape architecture accreditation practices in the United States, Türkiye, and Germany to compare commonalities and differences. The objective is to understand the role and potential of accreditation in addressing environmental challenges and proposing strategies for enhancing excellence and resilience in landscape architecture education.

The methodology includes a comprehensive literature review of landscape architecture accreditation frameworks and processes, along with a comparative analysis of accreditation standards. Long-term projected implications of current accreditation practices on broader environmental issues, the impacted student population, and the impact after graduation are discussed. Key findings on the effectiveness, challenges, and areas for improvement within each accreditation system, with implications for global harmonization in addressing current and future environmental challenges facing our planet are presented. Accreditation can serve as a catalyst for transformative change within landscape architecture education and practice. Collaborative initiatives, knowledge exchange, and advocacy efforts are key strategies for strengthening accreditation globally and addressing pressing issues highlighted in the "Code Red" theme of the IFLA 2024.

In conclusion, landscape architecture accreditation holds immense potential to shape the future trajectory of the profession in response to urgent global environmental challenges. By fostering collaboration, stakeholders can leverage accreditation to promote excellence, resilience, and sustainability in landscape architecture education and practice, thus contributing to a more resilient and equitable world.

Keywords: Landscape architecture, Accreditation, Comparative analysis, Sustainability, Environment

ORAL PRESENTATIONS

Sustaining Life: Protection, Mitigation & Management

Urban fringe biodiversity: coexistence of avian conservation and recreation

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Urbanization and its accompanying environmental changes have significantly impacted wildlife in urban areas, with habitat reduction and fragmentation posing a substantial threat to urban biodiversity. Bird diversity is an essential component of urban biodiversity and serves as a crucial indicator species for monitoring the quality of urban ecological environments. In the context of escalating urban biodiversity crises, this study aims to explore effective strategies for balancing bird diversity conservation with human recreational activities in urban fringe areas, using Beijing as a case study. Given its position along the East Asian-Australasian Flyway and remarkable bird diversity—ranking second among G20 capitals and accounting for over a third of China's bird species—Beijing presents a unique opportunity to explore this balance. This research focuses on Cuihu Wetland, Shahe Wetland, and their surrounding regions, epitomizing the conflict between ecological conservation and human leisure pursuits in urban fringes.

In the first step, the study is based on the scaling issues of landscape patterns and ecological processes, and the patterns of bird diversity conservation are analyzed separately at different spatial scales. At the geographical scale, the study evaluates the environmental requirements of migratory birds for stopover sites in front of the Yan Mountains, a significant ecological barrier, using a moving window method to analyze the distribution of bird stopover sites in the study area. At the ecosystem scale, cost-distance analysis constructs a regional accessibility distribution pattern for birds. At the landscape scale, a graph-based circuit model builds a flight network for birds in the urban fringe, identifying key avian flight corridors and establishing protective buffer zones based on bird flight initiation distance. At the patch scale, land cover, vegetation coverage, human settlements, and other data are weighted differently according to various bird habits to analyze the spatial suitability for foraging, breeding, and nesting. The results from these four scales are combined to determine the spatial distribution of areas important for bird diversity conservation. The second step involves identifying human recreational activity distribution in the urban fringe using population data, Points of Interest (POI) data, social media big data, and nighttime light intensity.

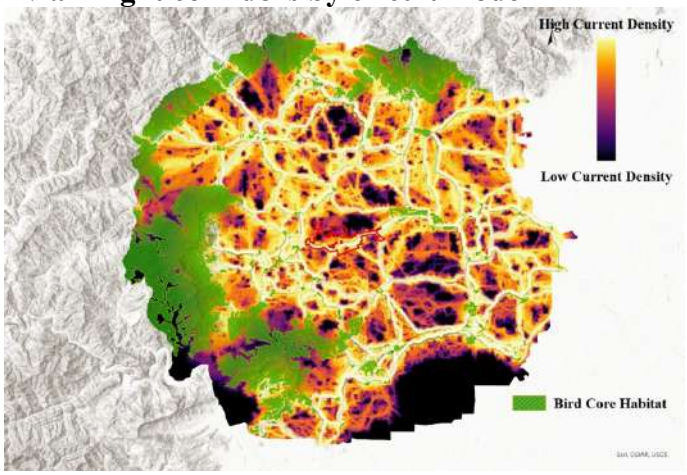
Integrating the spatial distributions of bird conservation importance and human recreational activities derived from the initial two steps, the study employs bivariate spatial autocorrelation analysis to categorize the study area. This categorization delineates areas as bird conservation-dominated zones, human activity-dominated zones, and human-bird overlapping zones.

Finally, by utilizing the spatialized residual distribution from the multi-scale geographically weighted regression (MGWR) model, the research identifies the varying intensities of human recreational threats to bird conservation across different areas, offering key insights for targeted urban wildlife management and habitat protection.

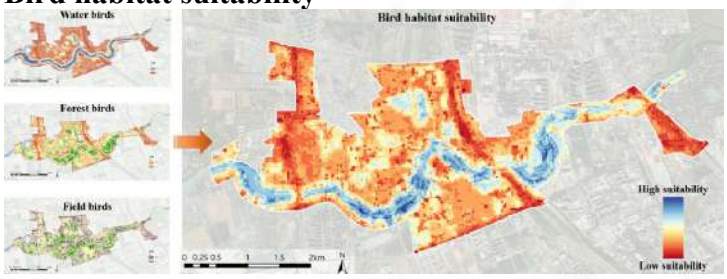
Synthesizing these findings, the study proposes spatial optimization and design strategies to foster the coexistence of bird conservation and human recreation. This approach not only addresses the 'CODE RED' state of urban biodiversity but also pioneers a collaborative framework for urban ecological sustainability.

Keywords: Urban Biodiversity, Avian Conservation, Coexistence of Birds and Humans, Multiscale Spatial Analysis, Landscape Patterns

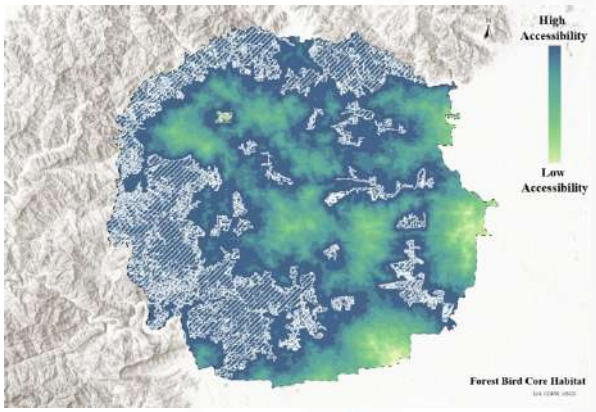
Avian flight corridors by circuit model



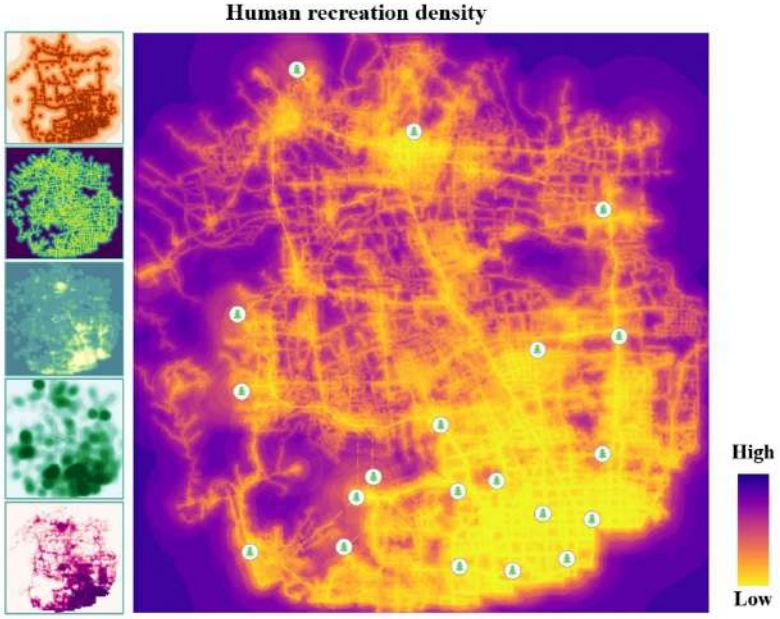
Bird habitat suitability



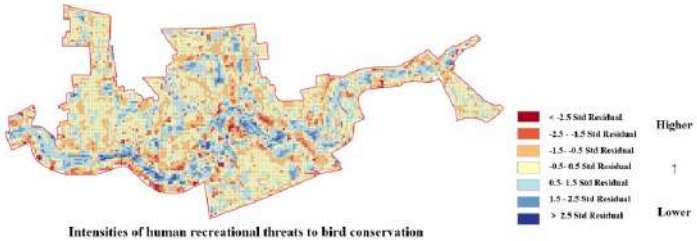
Forest Bird Core Habitat Distribution



Human recreation density



Intensities of human recreational threats to bird conservation



Intensities of human recreational threats to bird conservation

Sustaining and managing ecosystem services in urban wetlands for all

Xuezhu Zhai
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Department of Environmental Systems Science, ETH Zurich, Zurich, Switzerland

Wetlands are essential for maintaining the regional water balance, regulating the regional climate and preserving biodiversity. In China, natural wetlands have declined due to urban sprawl. In recent years though, cities have created a new type of urban wetland called wetland parks (WPs) to make up for the decline of natural wetlands and the ecosystem services (ESs) they provide. Understanding how public perceive ESs from WPs is not only important for enhancing human well-being, but also for continuing support and investment to environmental conservation and development of projects like WPs.

This study examines the Chinese public's perceptions of three ESs provided by WPs and compares them with the ESs measured using technical knowledge. Based on the author's previous study, the most valued ecosystem services by the public include wildlife habitat, aesthetics and recreation. The perception of these three ESs were analysed using mixed methods through a case study of Haizhu National Wetland Park in Guangzhou, China. For the purpose of augmenting the benefits that visitors receive from WPs, perception-influencing variables were identified and the relationship between the three ESs was addressed.

The findings indicate that the importance of wildlife habitat service was highlighted by visitors as having health benefits and leading to aesthetic appreciation but the species richness of WPs was underestimated. The perception of the three ESs were correlated; when the three ESs cannot be enhanced at the same time, the majority of visitors prioritise the aesthetic service, which benefits them the most. Improving wildlife habitat service and aesthetic value while maintaining the recreation service could provide the best utility.

This study contributes to our understanding of ESs associated with WPs, and the extent to which people are aware of, and value those services. It links landscape features to specific ESs, and citizen's perceptions of those services. Notably, the study evaluates ESs on a site scale, the most perceptible level to humans, offering a novel perspective often overlooked in the literature. Further, the results of the study uncover the attributes and factors that affect the provision of ES, arguing in favour of enhanced capabilities and quality in specific WPs. Enhanced understanding of resource allocation decisions, taking into account the synergies and trade-offs among ESs, contributes further to sustainable planning and management of urban wetlands.

Keywords: urban wetland, ecosystem services, perception, biodiversity, aesthetics

Quantifying carbon-saving of urban blue-green space in high-density urban area

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Urban Blue-Green Space (UBGS) responds to climate change by providing relatively cooler surrounding environments to indirectly reduce energy consumption by residents, in addition to directly adsorbing CO_2 from the air. However, potential of UBGS to achieve carbon-saving targets at the municipal scale is rarely addressed in literature. In this study, an ideal estimation model of carbon-saving is constructed from the user's perspective taking into account the cooling effects of UBGS and integrating surface temperature, building information, and urban public space layout. A high-density urban area in a northern cold region of China (Tianjin center urban area) is taken as an example to estimate the annual UBGS carbon-saving by performing Landsat surface temperature (LST) inversions with the delineation of the effective cooling area, as well as regression analyses based on four seasons of data. The results show that the annual UBGS carbon-saving in 2021 is about 78 tonneC/km², which is equivalent to 2.21 times the carbon sequestration of the same region. Compared with the edge of the center urban area, the UBGS in the heart has a carbon-saving with a 1.4 times higher fluctuation value and a cumulative annual difference of about 394 tonneC/km². Large UBGS patches in cold regions, while capable of conserving more carbon in spring, summer, and fall, become carbon sources in winter due to increased heating energy consumption and reduced willingness of residents to adopt zero-carbon transportation. The indicators that have the most significant impact on the carbon-saving of UBGS are the cooling area and the background LST. The UBGS coverage and the percentage of impervious surfaces, such as buildings and open spaces, will indirectly impact carbon-saving by affecting the cooling area of UBGS. The above finding recognizes the carbon-saving potential of UBGS in cold regions and provide a feasible estimation scheme for comparing the carbon-saving capacity of UBGS in different climate types.

Keywords: Carbon-saving by cooling, Urban high-density areas, Urban blue-green space

Impact of landscape pattern on ecosystem service trade-off in the-South-Taihang-Area

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With rapid development of urbanization, region landscape pattern was occurred intense changes, which has resulted in significant changes in the supply of urban ecosystem services. This situation has brought enormous pressure to the human living environment, and caused a series of ecological and social economic problems. Therefore, the study of urban landscape pattern and ecosystem service has become the current research hotspot. Ecosystem service （ ES） refered to the benefit of human received from ecological system and process directly or indirectly, which has become the bridge connecting nature and human society, also the important basis to accomplish regional sustainable development. Under the influence of human social economic activities and natural changes, multiple ESs interacted with each other and formed a trade-off relationship. So it has become the research focus that how to effectively manage the trade-off relationship between ESs.Landscape pattern (LP) was one of the direct driving factors of regional ES changes. Research on LP changes has become the crucial basis for accurate evaluation of ES potential， trade-off relation， and promotion of supply capacity, which was contributed to make scientific planning decisions under the framework of regional sustainable development.The South Taihang area was the important ecological barrier in central China and the core part of ecological protection area of the Yellow River Basin in Henan Province, which has the ascendant natural ecological environment and location conditions. In the process of South Taihang area urban agglomerations development, contradictions were discovered between economic development and maintenance of fragile ecological environment, as well as urban development and intensive use of land resources. Existing studies in South Taihang area included traditional village landscape, vegetation community, tourism development and other directions, while discussion on the trade-off relationship and influencing factors between LP and ES was not much. This paper took the South Taihang Area urban agglomerations of Henan Province as the study area. Firstly, ecosystem service assessment was conducted. Four typical ecosystem services, habitat quality, carbon stocks, soil and water conservation, and water resources conservation were selected, and ES at 1 km resolution ratio was quantitatively assessed based on ArcGIS 10.2 and InVEST model. Secondly, the trade-off and synergy of ESs were analyzed. Spearman correlation coefficient was used to analyze the relationships among four ESs in the study area from 2000 to 2020 took county as the statistical unit. Finally, effects of LP on ES trade-offs were analyzed. Patch area, shape index, connectivity and other 6 indicators were selected to reflect the composition and configuration of landscape pattern in the study area. Spearman correlation analysis and multiple linear regression model were used to construct R index, in order to evaluate direction and relative strength of each index on ES trade-off. This research was conducive to reveal the influence mechanism of LP on ES trade-off relationship, which could improve the ES trade-off relationship in the South Taihang Area urban agglomerations from the perspective of landscape management, and provide scientific reference for adjusting land use pattern and guiding ES sustainable management.

Keywords: landscape pattern, ecosystem service, trade-off, the South Taihang Area

Ecological wisdom of traditional settlement Landscape in Wuling Mountain Area

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The exploration and inheritance of traditional wisdom for coordinated management of production, living, and natural resources are key to biodiversity conservation and sustainable development in mountainous regions. The Wuling Mountain area is one of the 32 priority regions for biodiversity conservation in China and also a place where diverse ethnic groups reside. By employing a method that combines spatial morphology analysis with questionnaire interviews (74 in total), based on the theoretical framework of'village community', this study interprets the ecological wisdom contained within the landscape construction of 20 clannish immigrant settlements in Taiji Town of Wuling Mountain area (Fig.1) from three levels: values, institutional norms, and production and living practices. The findings reveal that the region possesses 4 categories of ecological wisdom: values for protecting mountainous and forestry environments based on beliefs in mountain gods, ancient trees, and land; regulations for maintaining public resources relying on clan property systems; wisdom related to traditional Feng Shui geomancy, including settlement site selection adapting to the terrain and the spatial layout pattern of "mountain-forest- settlement-agricultural field-river"(Fig.2); and the unique harmony between traditional production such as Hui ink making and natural resources conservation. The study proposes integrating local knowledge of diverse levels into landscape governance to promote the synergy between ecological stability maintenance and the sustainable acquisition of production resources in mountainous areas.

Keywords: landscape governance, ecological wisdom, traditional settlement Landscape, Wuling Mountain Area

Fig.1 the location of study area

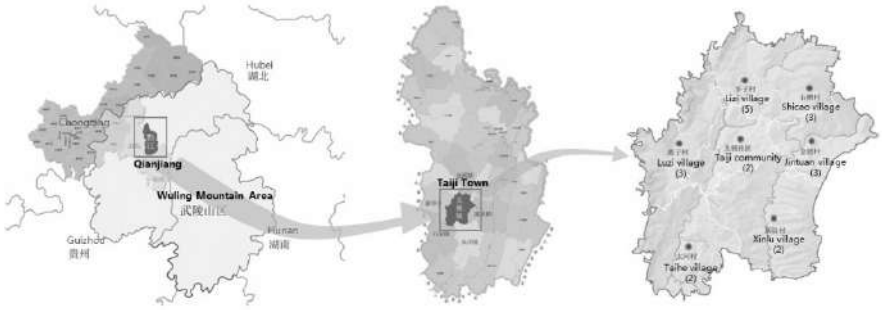
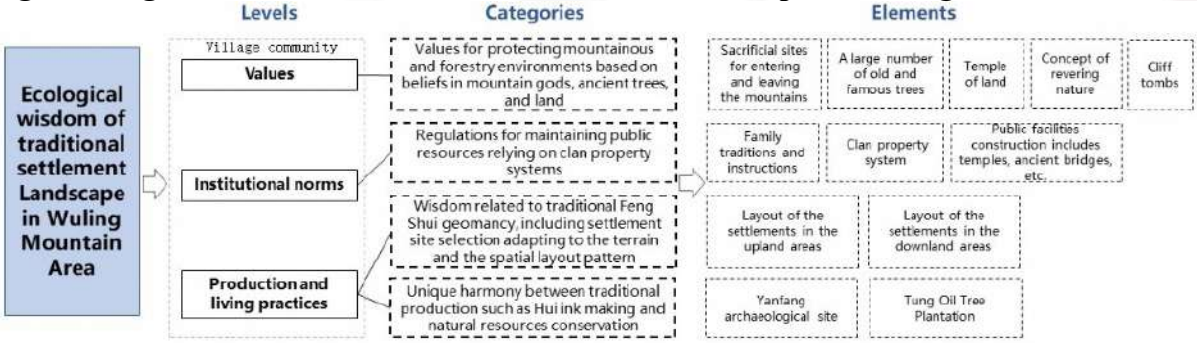


Fig.1 the location of study area.
(The number in parentheses indicates the number of settlements surveyed in each village within this study)

Fig.2 Jinji settlement in Lizi village

Fig.2 Jinji settlement in Lizi village: settlement site selection adapting to the terrain and the spatial layout pattern of "mountain-forest- settlement-agricultural field-river"

Fig.3 Ecological wisdom of traditional settlement Landscape in Wuling Mountain Area



Research on rural landscape characteristics under collective memory

Ting Yang, Chunlan Du, Danyang Chen
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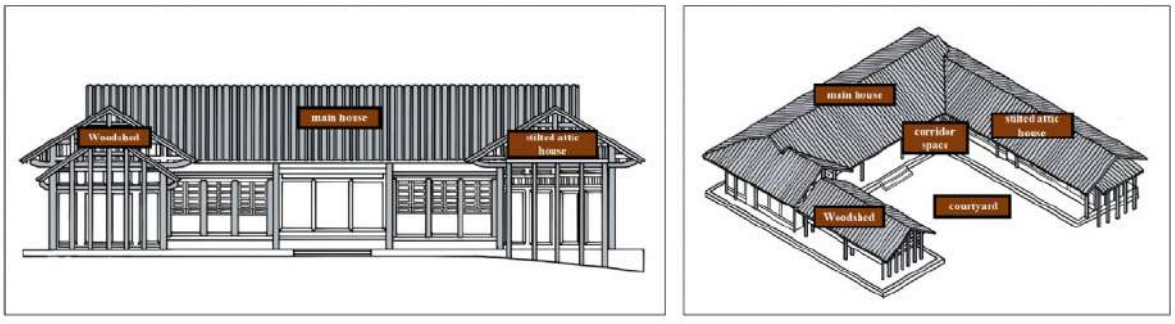
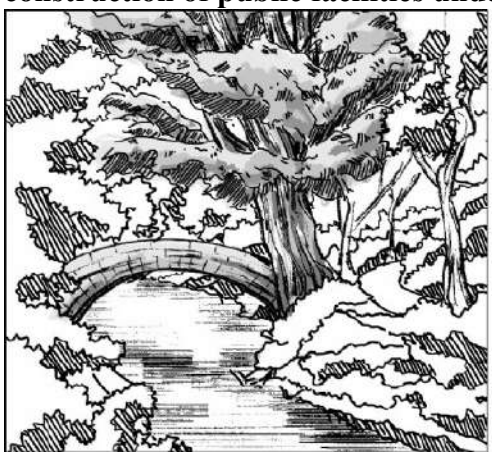
Rural landscape characteristics are specific sites that carry unique information of village landscapes, record and showcase collective memories of villagers, and constitute the fundamental essence that distinguishes a place from others. Understanding the spatial features of rural landscapes, identifying and expressing the local characteristics of rural landscapes, have become crucial for constructing beautiful and livable rural areas, as well as promoting harmonious development of rural human-environment relationships. By applying the theory of collective memory and utilizing various types of literature research and local oral history research methods, this study takes Taiji Township in Qianjiang, a region in the Wuling Mountain area characterized by historical complex ethnic migrations and cultural interactions, as an example. It identifies, categorizes, and extracts the local characteristics embedded in the rural landscape from the perspectives of environment, architecture, and culture. This results in the establishment of a systematic expression framework of local characteristics of rural landscape in Taiji Township, Qianjiang District, Wuling Mountain area, comprising 2 main categories, 3 large categories, 6 medium categories, and 28 small categories based on collective memory. Furthermore, it proposes ideas for the localized protection and inheritance of rural landscape characteristics in the Wuling Mountain region. The study demonstrates that exploring rural landscape characteristics from the angle of reviving villagers' collective memory offers a unique approach to delve into and preserve the local features of rural landscapes, enriching the research methods and perspectives on rural landscape characteristics. It also provides guidance and insights for the localized construction, protection, and utilization of rural landscapes in Taiji Township and the broader Wuling Mountain region.

Keywords: Rural landscape characteristics, Collective memory, Expression system of landscape characteristics, Wuling Mountains, Taiji Town in Qianjiang District

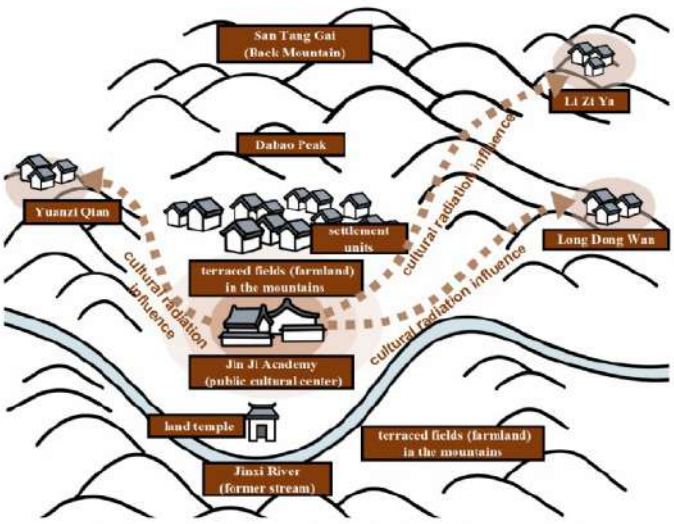
Construction of courtyard households coexisting with immigrant and local residents



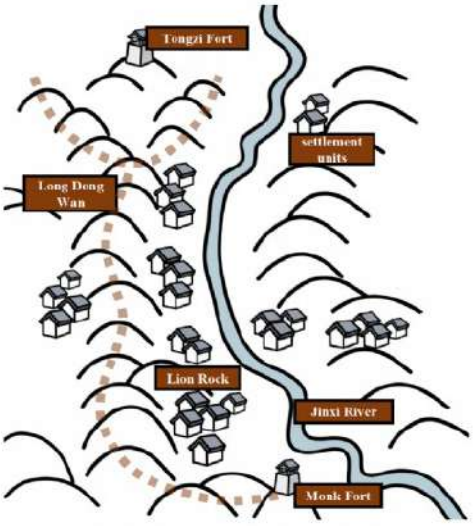
construction of public facilities under the context of collective memory



Construction of settlement units in the context of collective memory

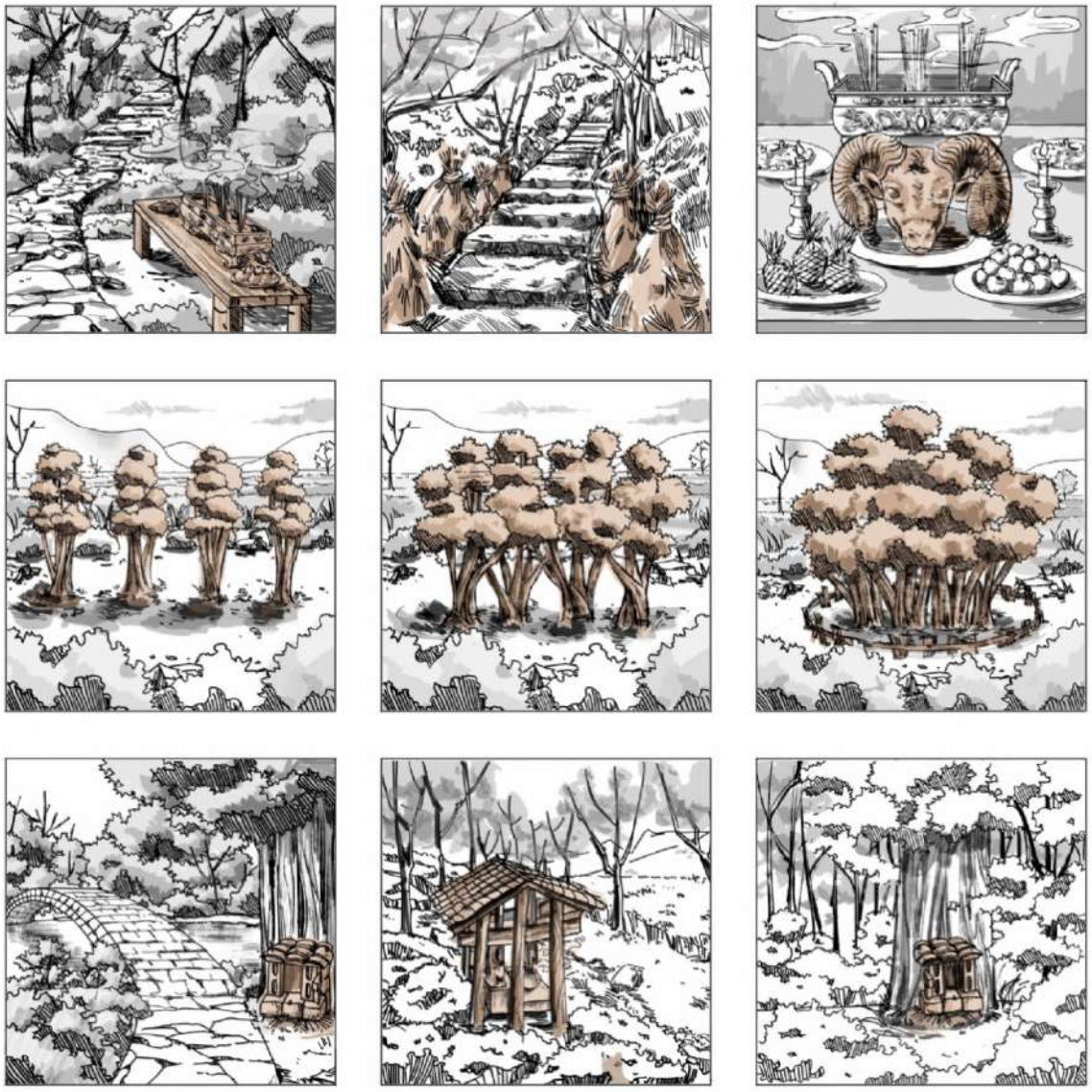


The trisectional structure of "Mountain-Town-Farmland" in the living units of "Ba Zi" on shallow hills (e.g., Jin Ji Ba in Li Zi Village)



the free and flexible "farmland-settlement" dispersed layout pattern in high mountain areas (such as Lizicun and Longdongwan)

Guardianship of "Mountain Deity, Ancient Tree, and Land" in collective memory



'Suitable Mechanization Transformantion' Effects on Farmland Ecosystems in China's Hills

Jie Ren, Xiaohui Xu
Department Of Architecture And Environmental Art, Sichuan Fine Arts Institute, Chongqing, China

Hilly and mountainous areas in China are pivotal for producing vegetables, grains and oils, playing a crucial role in the revitalization of rural China. However, due to terrain constraints, the level of agricultural mechanization in these regions lags significantly behind that in the plains, resulting in considerable delays in the modernization of agriculture and rural development. Implementing engineering transformations, such as merging small plots into larger ones, lextending shorter plots, and flattening slopes for mechanized farming are essential measures to mitigate the mechanization delay in hilly areas. By investigating the changes in the farmland ecological landscape patterns before and after farmland construction suitable for mechanization, this study aims to promote identify effective strategies for refining the design of farmland suitable mechanization transformation in hilly areas and, consequently, boosting agricultural productivity.

This research focuses on Dianjiang County, as a case study, exemplifying a typical hilly and mountainous region in China. Between 2020 and 2021, Dianjiang County experienced a transformative farmland suitable mechanization project, resulting in notable spatial alterations in its farmland ecological landscape patterns across nearly five years. By analyzing the land cover remote sensing data from 2019, 2021, and 2023 in Dianjiang, this study calculates the farmland landscape pattern indices and the land use transition matrices, thereby developing a dynamic atlas model to depict the farmland ecosystem landscape patterns during this period, utilizing methodologies such as CLUE-S and Markov chains. The study observes changes in land use properties (LULC analysis, NDVI analysis), fragmentation（Landscape Metrics analysis, Patch Shape index, Landscape Division index), and utilization benefits（Economic Benefit analysis, Ecological Benefit analysis, Social Benefit analysis）, applying GIS for spatial analysis, spatiotemporal data management and visualization of farmland alterations. This approach facilitates an in-depth understanding of the characteristics and trends in ecological landscape pattern transformations in farmland before and after suitable mechanization.

Between 2019 and 2020, Dianjiang County's cultivated land landscape experienced a reduction in area and an escalation in fragmentation, with the shapes of patches becoming simpler. In contrast, the area of orchard landscapes expanded, the fragmentation diminished, and the complexity of patch shapes increased. Following the farmland mechanization transformation project conducted from 2020 to 2021, data from after 2021 revealed a bidirectional dynamic shift in land use properties, prompted by the expansion of urban fringes. This period also witnessed a declining trend in both the total number and density of cultivated land patches, alongside an increase in the cohesion of the largest patches. Consequently, the overall efficiency of farmland utilization improved by a factor of 2.3, thereby boosting agricultural productivity.

After adjustments to the farmland layout and rehabilitation of the soil, the hilly region of Dianjiang County witnessed a comprehensive update in the patterns of its farmland ecosystem landscape, which included improvements in soil conditions, topographical states, and cultivation benefits. This resulted in an expanded farmland area, more intensive land layouts, decreased fragmentation of farmland, and significant enhancements in soil quality. Ultimately, these measures transformed abandoned farmland into high-quality arable land, achieving true conservation of farmland.

Keywords: Landscape Pattern in Farmland Ecosystem, Dynamic Spatial Atlas Model, Suitable Mechanization Transformantion, Hilly and Mountainous Area

Societal challenges in coastal landscape transformation in Sisal, Yucatán

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[1]Faculty of Architecture, National Authonomus University of Mexico
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Sisal is a small coastal barrier island with a 2000 people community on the Yucatán Peninsula surrounded by dunes and mangroves. It is home to thousands of flamingos and other bird species that bring natural and international tourism to the zone. This site is a blue carbon ecosystem, rich in biodiversity, and provides many ecosystem services to the peninsula. This area shelters embryonic shifting dunes, primary dunes, red and white mangroves, as well as a turtle nesting area. It is not surprising that this 300-hundred-year-old natural and cultural heritage village was recently recognized as a “Magic Town”, a designation by the National Secretary of Tourism, in which the natural and cultural resources are renowned for their unique nature. Contrary to the goal of this recognition, which is the sustainable development of local communities, the local population was against this decision, because it brought the attention of national and international investors changing dramatically. Dune deforestation began to provide shade and the traditional sand and sea image to the many tourists arriving each vacation period. Locals expect to have a greater income due to the installations of “palapas” (palm leaf roof structures) that displace the dynamic dune zone, a way to provide more services to visitors.

This work presents the interdisciplinary work in progress between ecologists, landscape architects, architects, environmental engineers, and geomatics who work to address a design paradigm: protect, mitigate, and manage the coastal zone while the local community receives a benefit from the change in economic activities, adapts to the social changes, and gives alternatives for the preservation, and reproduction of local ecosystems to protect and mitigate from extreme climate events.

This proposal faces many challenges. One of them is the speed at which changes are taking place, the anger, displeacement, and displacement of the Sisal community facing the federal government decisions that directly affect their territory, habits, and traditions. On the other hand, the reduction of the dune and the blue carbon ecosystems such as mangroves and seagrasses make the zone more vulnerable to extreme climate events. The design approach uses renders, and a small demonstration zone, that mixes dune conservation, and recreational uses as visually appealing and comfortable alternatives to the “traditional” shade construction, and the societal challenges it faces in the process.

Keywords: social vulnerability, coastal risks, landscape design for protection, coastal biodiversity.

Dune deforestation

Dunes deforestation due to traditional tourism activities by local habitants faces opposition from different groups of the community.

The spatiotemporal Patterns and Mechanisms of Wilderness Ecological Benefits Impacts

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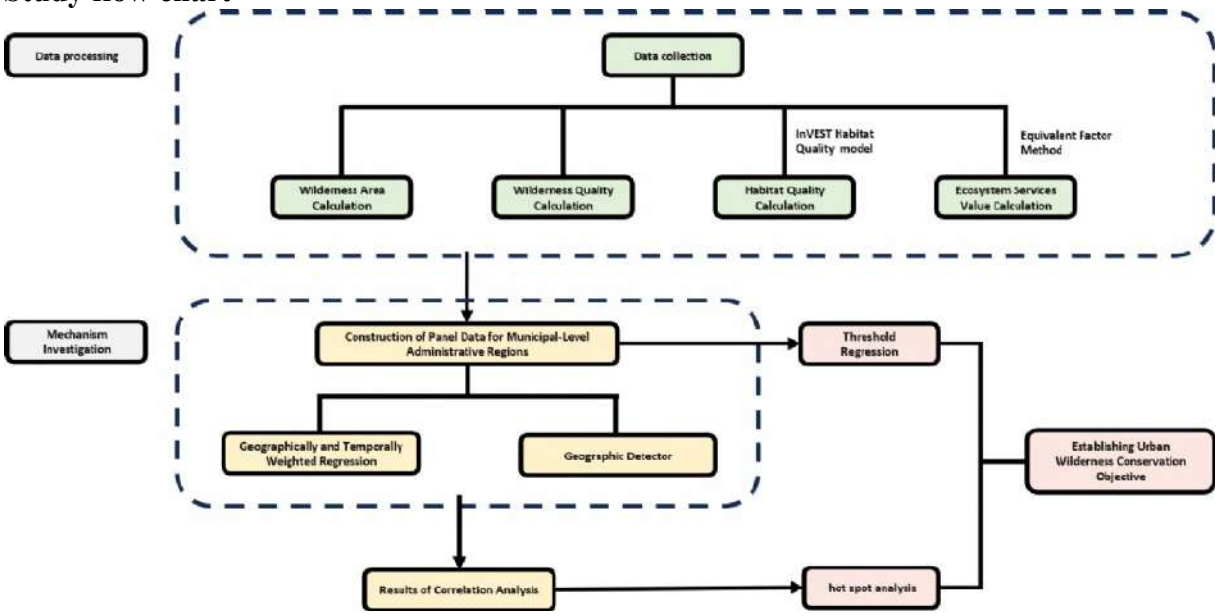
Wilderness are largely unmodified or slightly modified areas, retaining their natural characteristics and influence, without permanent or significant human habitation. Wilderness plays a crucial role in conserving biodiversity, maintaining ecosystem services, and other ecological benefits. Therefore, the preservation of existing wilderness areas is of paramount importance for both humanity and nature. However, the contribution mechanism of wilderness to conserving biodiversity and sustaining ecosystem services at the urban scale is not fully understood. Therefore, this study focuses on 352 prefecture-level administrative regions in China, spanning the period from 2000 to 2020. Then, identifying and calculating wilderness indicators, such as the area and quality of wilderness, and their trends at the prefecture-level administrative scale. In addition, Utilizing InVEST to calculate habitat quality for reflecting biodiversity and employing the equivalent value factor method to calculate China's ecosystem services value. The research will explore the driving mechanisms of the impact of wilderness indicators on the spatial and temporal distribution of biodiversity and ecosystem services value through the geographical and temporal weighted regression and the geographical detectors. The results indicate: (1) The wilderness area and quality in the study area exhibit significant spatiotemporal heterogeneity and show an overall declining trend. (2) At the prefecture-level administrative scale, wilderness area and quality significantly drive habitat quality and ecosystem services. Moreover, the wilderness area and quality exhibit pairwise synergistic interactions, thereby enhancing efficiency. (3) Utilizing hot spot analysis (Getis-Ord Gi) to identify key urban clusters, applying threshold regression to assess threshold effects on the influencing mechanisms, and constructing urban objectives. This study elucidates the impact of wilderness area and quality at the prefecture-level administrative scale on habitat quality and ecosystem services. It provides theoretical support for the formulation of wilderness conservation policies for urban areas and the enhancement of urban biodiversity and ecosystem services. Furthermore, it makes a significant contribution to achieving the of the 21 action-oriented targets for 2030 in the Post-2020 Global Biodiversity Framework (GBF).*

Keywords: Wilderness, Habitat quality, Ecosystem service, Spatiotemporal patterns, 352 prefecture-level administrative regions in China

Study flow chart



Introduce the overall research process framework for the dissertation

Construction and Optimization of North-China Leopard Habitat Network in Jinzhong

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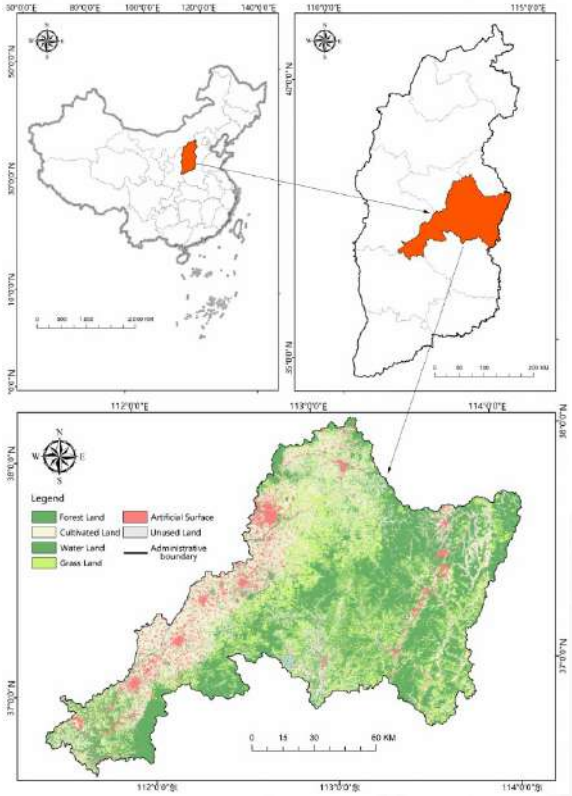
This study proposes a proactive landscape strategy of constructing and optimizing habitat networks, with a focus on the North-China leopard as a flagship species in Jinzhong City, Shanxi Province, one of the areas with the highest known density of North-China leopards in China. As an umbrella species, the habitat requirements of the North-China leopard encompass those of other species, making it crucial for maintaining ecological balance in the region. Over the past fifty years, the habitat of the North-China leopard has been continuously degraded by human activities, resulting in habitat fragmentation and the disappearance of migration corridors, posing a severe threat to its survival. There is an urgent need to reconstruct and optimize the habitat network for the North-China leopard to restore its wilderness habitat. This study, using Jinzhong City as a case study and focusing on the North-China leopard, conducted research on the construction and optimization of habitat networks based on the MSPA-InVEST-MCR comprehensive model. The research methodology included: (1) Morphological Spatial Pattern Analysis (MSPA) for identifying landscape types across the Jinzhong City. (2) Evaluation of North-China leopard habitat quality using the habitat quality assessment of the InVEST model, integrating MSPA landscape types and landscape connectivity assessment to comprehensively identify North-China leopard habitat source areas. (3) Construction of a comprehensive resistance surface for the North-China leopard based on habitat requirements and migration characteristics, utilizing the Minimum Cumulative Resistance (MCR) model and gravity model to extract significant ecological corridors. (4) Identification of ecological nodes. (5) Construction and optimization of a comprehensive habitat network focused on North-China leopard conservation through data analysis and manual assessment. The results indicate: (1) Identification of 15 North-China leopard habitat source areas covering a total area of 1701.23km2, primarily concentrated in the central and eastern mountainous regions with evident fragmentation characteristics. (2) The maximum value of the comprehensive resistance surface of the North-China leopard constructed by 11 natural and cultural factors is 97.4, and the minimum value is 8.2. The high resistance area is the western plain area and the construction land in the eastern mountainous areas. (3) Extraction of 105 potential ecological corridors based on the comprehensive resistance surface, refined to 20 significant corridors using the gravity model, primarily distributed in regions with better ecological conditions and established nature reserves but lacking connectivity with peripheral habitat source areas, exhibiting low connectivity levels and gaps in corridor coverage in certain areas. (4) Determination of nine optimized corridors and identification of 24 strategic ecological nodes distributed along ecological corridors with important ecological foundations, with an additional 19 artificial ecological nodes located at intersections between ecological corridors and major highways or railways. (5) Construction of a North-China leopard habitat network comprising 15 ecological source areas, 29 ecological corridors, and 43 nodes of various types, characterized by a centralized core and dispersed periphery in spatial distribution, demonstrating high network integrity. The research findings provide decision-making references for the construction of the North-China leopard habitat network in Jinzhong City, planning practices for key ecological corridors, and regional biodiversity conservation efforts.

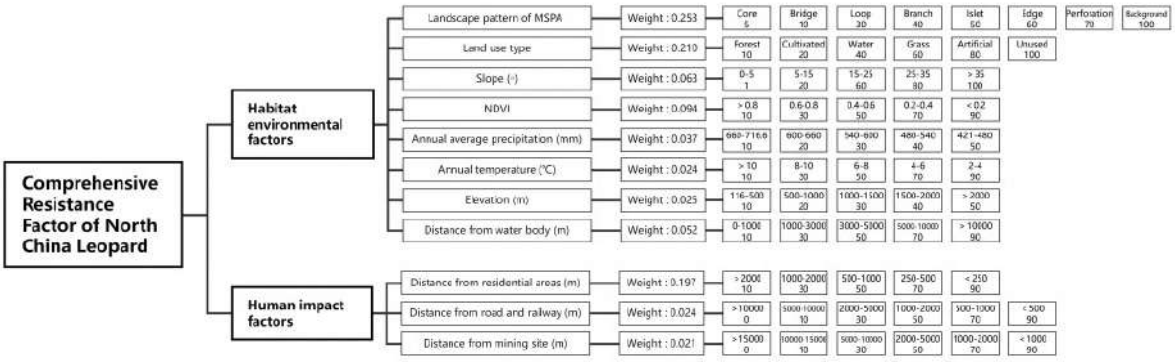
Keywords: Habitat Network, Biodiversity, Morphological Spatial Pattern Analysis (MSPA), Minimum Cumulative Resistance Model (MCR), Integrated Valuation of Ecosystem Services and Tradeoffs (InVEST)

Figure 1. Geographical location and land-use map of the study area



The research area is Jinzhong City, Shanxi Province, China, with a total area of 16396.7 square kilometers. Jinzhong is an area known to have a high-density distribution of North-China leopards in the Taihang Mountains, which is of great research significance for studying the survival status of North-China leopards. And this area is located in the key corridor from Taihang Mountain to Taiyue Mountain, which is also an important source for transporting leopard individuals from Taihang Mountain to the north, and its conservation status is very important.

Figure 2. Grading assignment and weight of resistance factor based on the habitat and movement characteristics of the North China leopard



Based on the habitat characteristics of the North China leopard and the impact of humans on its activities, and referring to other relevant research literature, a total of 11 influencing factors were selected to construct the ecological resistance surface of the North China leopard. The Analytic Hierarchy Process (AHP) was used to determine the weights of each influencing factor, with resistance values ranging from 0 to 100. The higher the value, the greater the movement resistance of the North China leopard.

Habitat suitability and sensitivity measurement table

Land Use Type	Habitat	Threat		
	North China Leopard	Cultivated Land	Artificial Surface	Unused Land
Forest Land	1	0.5	1	0.8
Cultivated Land	0	0	0.5	0.5
Water Land	1	0.7	1	0.9
Grass Land	0.8	0.3	1	0.8
Artificial Surface	0	0	0	0
Unused Land	0	0	0	0

Define cultivated land, artificial surface and unused land as threat sources, refer to the recommended values of the InVEST model, relevant literature, and the habitat requirements of the North China leopard, determine the impact range of threat sources, sensitivity parameters of habitat types to threats, and habitat suitability parameters.

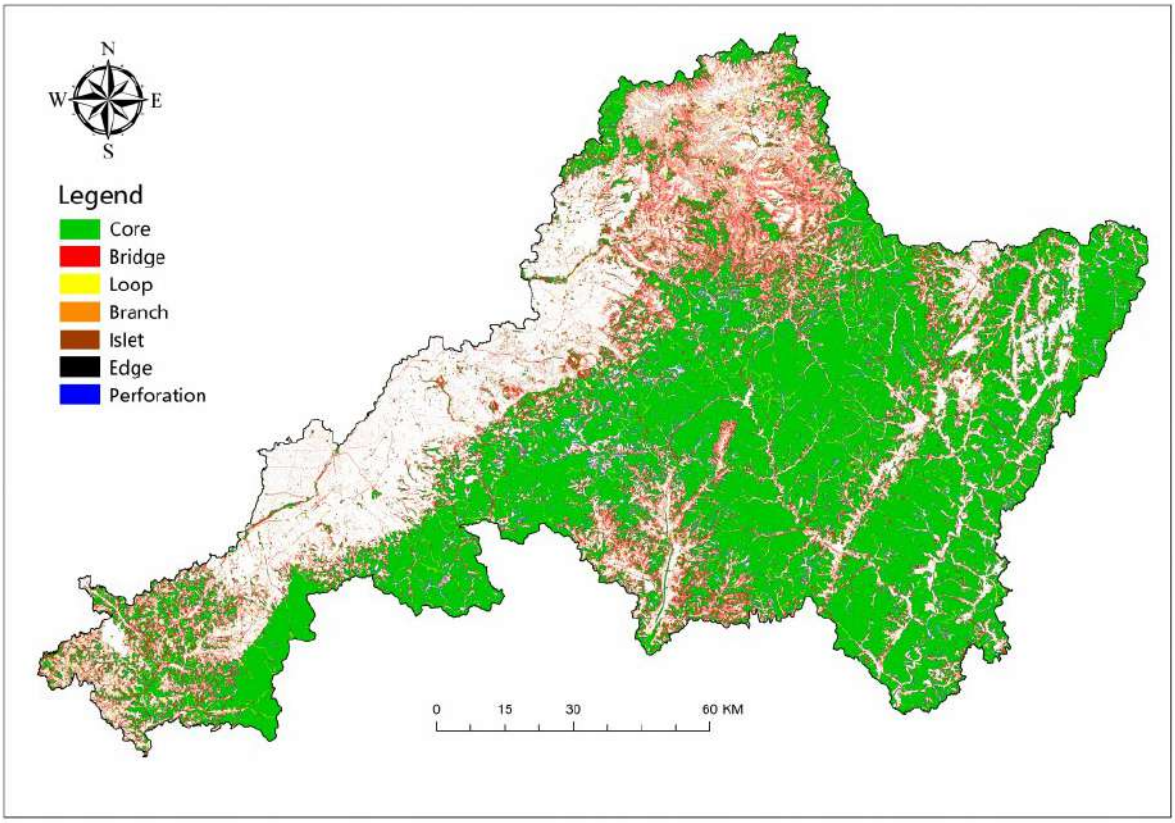
The Ecological Meaning and Statistical results of MSPA classification

Landscape Type	Significance	Total Area (km2)	Percentage in the Foreground	Percentage in the Study Area
Core	The large ecological patch in the foreground has great significance for the protection of biodiversity and can be used as an ecological source	7399.63	69.89%	45.13%
Bridge	Represents corridors connecting patches in ecological networks, plays an important role in landscape connectivity and species migration	1037.44	9.80%	6.33%
Edge	Area between the core area and the non-green landscape	883.53	8.34%	5.39%
Loop	The channel connecting the same core area is a shortcut to species migration within the same core area	398.202	3.76%	2.43%
Perforation	Transition region between the core area and the non-green patches, with a marginal effect	223.53	2.11%	1.36%
Branch	The area with only one end connected to the main patch is a gateway for species migration with the surrounding landscape	375.02	3.54%	2.29%
Islet	Unconnected small and broken plates have a low connectivity between plates and a low possibility to communicate between matter and energy	270.44	2.55%	1.65%
Total		10587.792	100%	64.57%

The total research area is 16396.7 km2. The area of foreground elements is 10587.792km2, accounting for 64.57% of the total research area. Among them, the core area covers an area of 7399.63km2, accounting for 69.89% of the foreground element area, concentrated in the central and eastern mountainous areas of the study area; The number of core patches in other

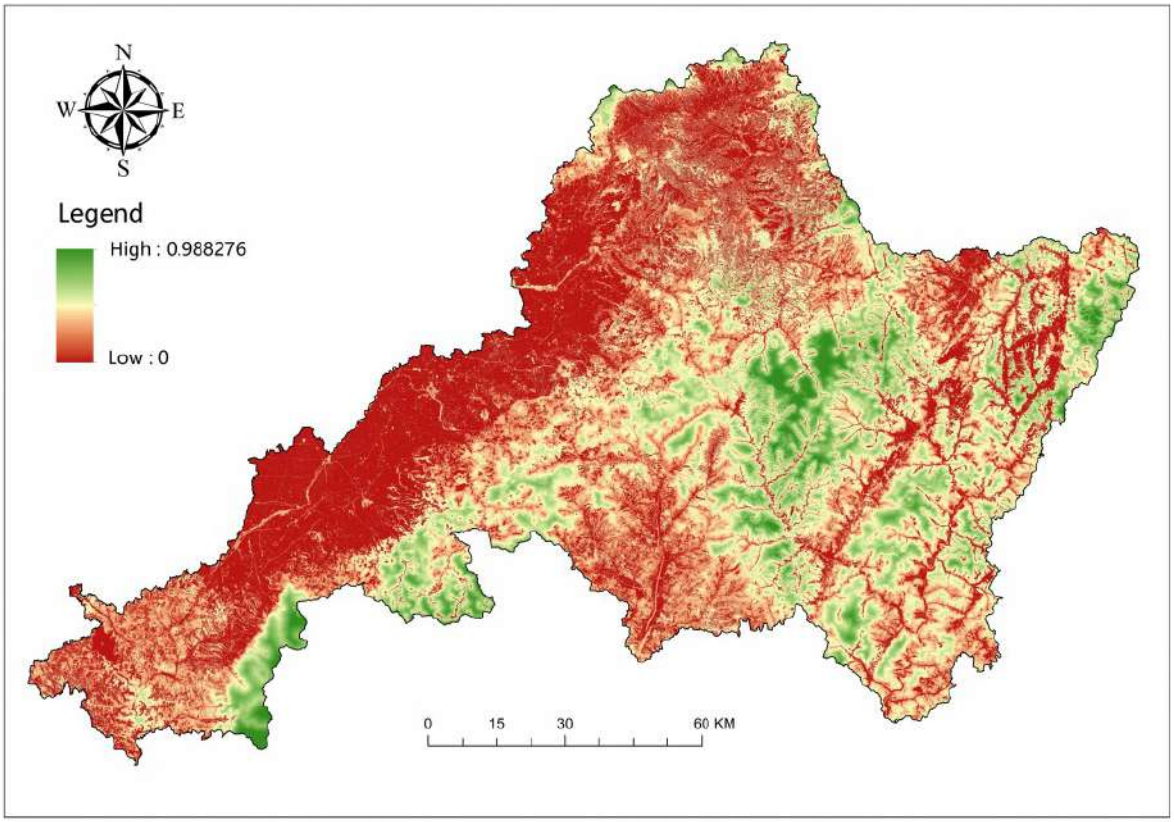
areas is relatively sparse and scattered, with severe east-west differentiation and high fragmentation, which is not conducive to the overall connectivity of the research area. As a bridge connecting the core area, the bridge has an area of 1037.44km2, accounting for 9.8% of the foreground element area, and has a high potential for forming ecological corridors. The edge and perforation area both have edge effects, accounting for 8.34% and 2.11% of the foreground element area, indicating that the core area within the study area is relatively stable. In addition, Islet area account for 2.55%; The proportion of loop area is 3.76%, which can provide a dispersal medium for species in the core area; Branch area account for 3.54%, providing a connecting effect between foreground elements and background.

Figure 3. Landscape pattern of MSPA in Jinzhong



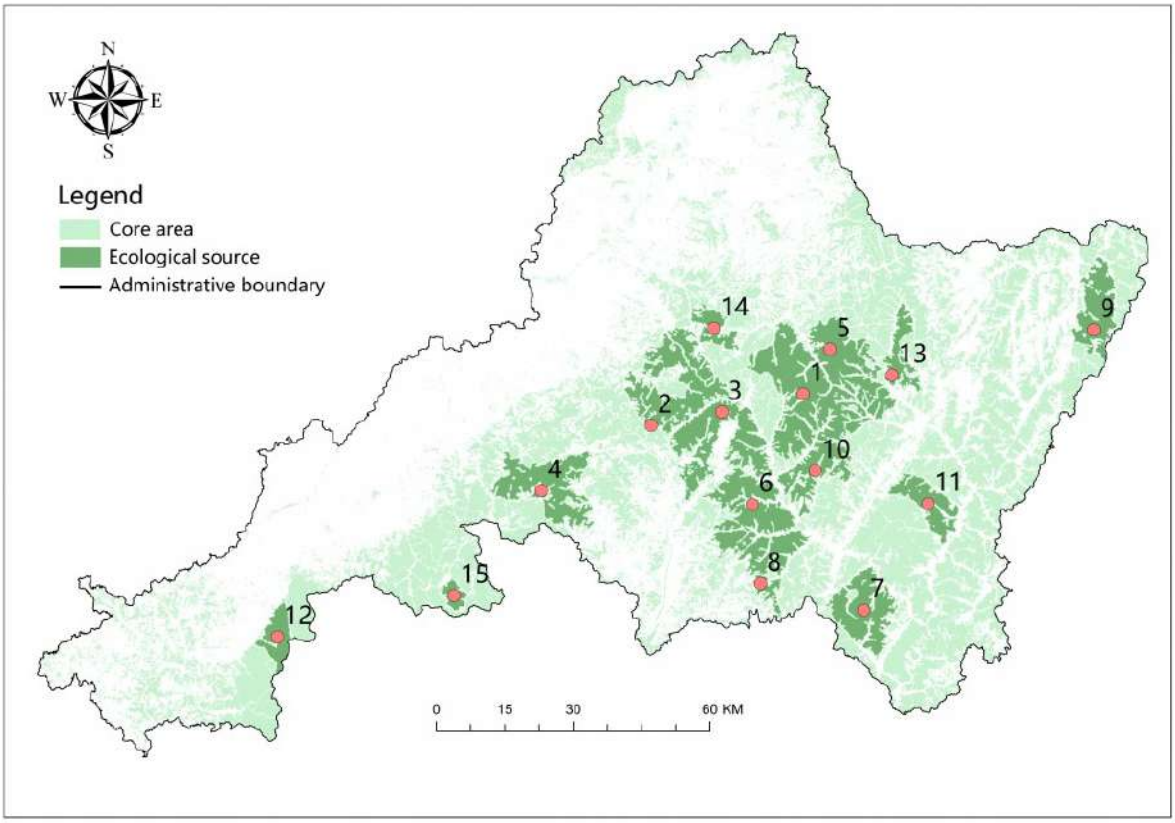
MSPA utilizes mathematical morphology principles to measure, select, and segment geographic data based on spatial morphology, in order to distinguish different landscape types.

Figure 4. The analysis results of habitat quality index for North China leopard



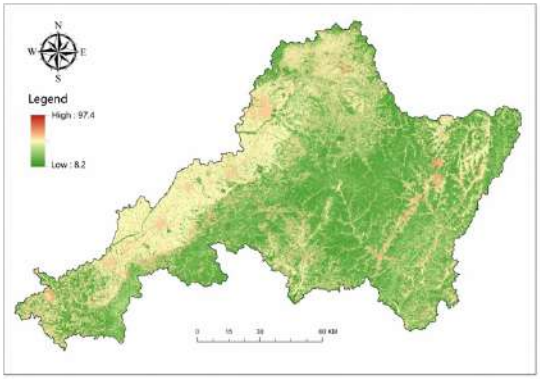
Evaluation of North-China leopard habitat quality using the habitat quality assessment of the InVEST model.

Figure 5. Ecological source land extraction process



After identifying the core area using MSPA and combining it with the habitat quality evaluated by the InVEST model, 15 important core patches were selected as the habitat source areas for the North China leopard

Figure 6. A comprehensive resistance surface constructed based on the habitat and movement characteristics of the North China leopard



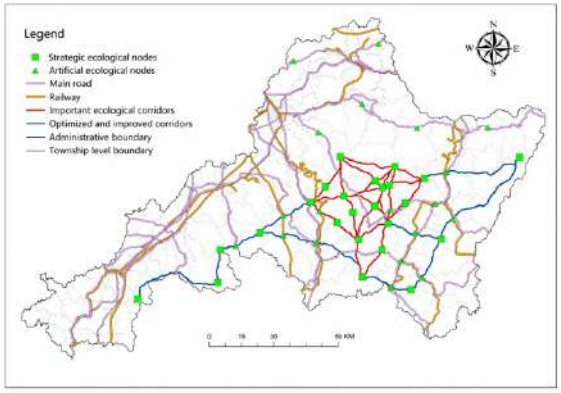
Construction of a comprehensive resistance surface for the North-China leopard based on habitat requirements and migration characteristics.

Interaction matrix of ecological sources based on a gravity model

Number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1		4.02	13.14	1.04	36.18	6.82	1.19	2.75	0.67	16.29	1.91	0.14	10.93	6.26	0.42
2			22.10	4.14	2.62	6.21	0.90	2.68	0.31	3.06	0.70	0.23	1.57	6.56	0.84
3				2.22	6.15	11.24	1.22	3.57	0.45	7.98	1.20	0.20	3.16	13.12	0.65
4					0.81	1.67	0.45	1.13	0.17	1.02	0.35	0.38	0.59	1.27	2.30
5						3.52	0.90	1.81	0.86	6.73	1.58	0.13	20.87	6.16	0.36
6							3.03	18.40	0.45	20.04	1.95	0.18	2.81	2.91	0.55
7								5.83	0.33	2.37	1.92	0.08	0.99	0.61	0.22
8									0.38	6.69	1.65	0.15	1.69	1.45	0.46
9										0.60	0.69	0.05	1.24	0.39	0.11
10											3.47	0.14	6.18	2.73	0.40
11												0.07	2.65	0.67	0.18
12													0.11	0.15	0.81
13														2.48	0.28
14															0.45

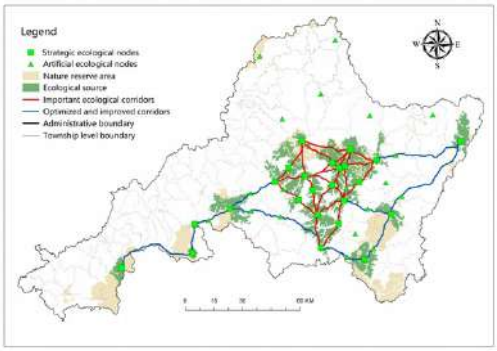
20 primary corridors (gravity value greater than 6) were determined by combining the force matrix results of the gravity model. At the same time, 9 corridors with important locations but poor connectivity were manually identified as optimization and upgrading corridors. These 29 corridors, as important ecological corridors, need to be protected.

Figure 7. Distribution of ecological corridors and ecological nodes



According to the positive and negative terrain comprising the comprehensive resistance surface, the ecological corridors and artificial environment were integrated, and ecological nodes were divided into strategic ecological nodes and artificial ecological nodes. Using the intersection of ecological corridors and natural environmental elements as strategic ecological nodes to play a fundamental control role in the ecological network. Set the intersection of ecological corridors with major highways and railways as artificial ecological nodes, requiring special consideration in ecological construction.

Figure 8. Comprehensive Habitat Network of North China leopard



Construction of a North-China leopard habitat network comprising 15 ecological source areas, 29 ecological corridors, and 43 nodes of various types, characterized by a centralized core and dispersed periphery in spatial distribution, demonstrating high network integrity.

Hybrid landscapes: Qing Agricultural Experiment Station's design fusion

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Qing Agricultural Experiment Station, founded in 1906, was a concrete expression of the late Qing Dynasty's New Deal reforms, showcasing the government's commitment to landscape transformation. It represented a melding of spatial patterns, blending local design with foreign elements to create a unique functional landscape. The Station reimagined from the foundations of traditional Northern Chinese gardens, became the inaugural modern park accessible to the public in Beijing. The design of Qing Agricultural Experiment Station merged Chinese and Western styles and broadened the modern park's functions to encompass recreation, education, and conservation. This approach also spawned unique facilities such as botanical gardens, zoological parks, and research plots, providing both scientific advancement and public awareness. These observations highlight Qing Agricultural Experiment Station's unique role in the evolution of Chinese landscape modernization. Interpretation of its landscape style and pattern offers insights into the development and the ongoing transformation of urban public spaces.

This study conducts a comprehensive analysis of diverse historical materials—archival records, newspaper clippings, vintage photographs, and travelogues—to reconstruct the landscape patterns of Qing Agricultural Experiment Station. It also examines how these functional attributes shaped public perceptions and expectations of urban public spaces. We collated the travel routes of the officials who went abroad, and inferred the representative botanical gardens and zoos in Europe and Japan from that era inspired the design of Qing Agricultural Experiment Station. The final landscape was shaped after carefully adapting these ideas to the local context. Additionally, Qing Agricultural Experiment Station, as a historical landscape embodying contemporary features, vividly showcases modern aesthetic tendencies. Employing field research and cartographic analysis, this study investigates the landscape traits and explores the factors driving its unique development.

This research aims to explore the following questions:①Qing Agricultural Experiment Station represents a vital advancement in landscape design, particularly through the integration of diverse styles and functional layout. The incorporation of modern architectural styles and design techniques has infused the traditional city with a novel spatial experience, integrating functions like scientific research, education, and exhibitions into urban public spaces. These alterations have enriched the city's aesthetic, intertwining with its memory and historical continuity. ②By comparing and analyzing similar cases of domestic and international, the research further analyzes the ground’s on-site characteristics and strategic design approaches, including agritourism. The insights not only enhance our understanding of its design but also reveal how these strategic initiatives critically influenced the development of agricultural proving grounds across China. Qing Agricultural Experiment Station can be seen as a pioneer of modern agricultural experimentation and exhibition space in China, with its impact bearing deep historical and practical consequence both nationally and globally. ③ Nowadays, Qing Agricultural Experiment Station Former Site, preserved within Beijing Zoo,

stands as a testament to heritage conservation in urban design, enhancing accessibility and informing modern public space creation.Merging historical resources with contemporary design enriches urban public spaces, providing residents with meaningful and functional environments.

Keywords: Modern landscape architecture, Chinese garden, Agricultural landscape, Qing Agricultural Experiment Station, Beijing Zoo

Research on Climate Crisis Response through Nature-Based Solution

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The background of this study began with the recognition that in a situation where natural disasters caused by the climate crisis are becoming more serious day by day, it is necessary to find ways to respond to the climate crisis in the external environment. The purpose of this study is to study Nature-based solutions as a way to respond to disasters caused by climate change, thereby simultaneously responding to the climate crisis and increasing biodiversity. The research method investigates the patterns of disasters caused by climate change and Nature-based solutions as a way to respond to them through theoretical consideration. In addition, we study cases of domestic Nature-based solution research to explore various Nature-based solution methods and present the effects of responding to the climate crisis, increasing biodiversity, and solving social problems through this. Research results show that the climate crisis is caused by the increased use of fossil fuels due to human industrial activities, including CO2, methane, nitrous oxide, HFCs, PFCs, and SF6. refers to the generation of greenhouse gases that raise the Earth's temperature, causing various natural disasters such as torrential flooding, coastal flooding, drought, and forest fires. Climate change means a change in the energy balance of the climate system due to greenhouse gases generated by human activities (IPCC 4th report). Aspects of disasters caused by climate change include floods, submergence, drought, forest fires, high temperatures, and biodiversity loss, and nature-based solutions have been proposed as a way to respond to these, which is a way to view nature as an object of development or protection. It was presented with a focus on the fact that it is helpful in solving various social problems, rather than just seeing it as a problem. At the 2019 Climate Action Summit, Nature-based solutions were included in the seven carbon neutral solutions. A specific example of how this Nature-based solution can be applied in cities is Korea's natural environment restoration project. Nature-based solutions in natural environment restoration projects include vegetation restoration to reduce carbon, restoration of waterways and wetlands to reduce local flood damage, creation of habitats for biodiversity, and reflection of residents' opinions when constructing projects. The effects of Nature-based solutions include reducing soil erosion, responding to drought, reducing carbon, increasing biodiversity, and addressing social effects in response to the climate crisis. Through this study, we learned that Nature-based solutions can also enjoy the effects of responding to the climate crisis, increasing biodiversity, and solving social problems. In the future, when creating an external environment, Nature-based solutions should be considered first to solve various social problems such as improving the value of the ecosystem, ensuring a safe society from the climate crisis, and reflecting social needs. Institutional support for this is needed, and active efforts from experts in academia, industry, and administration are likely to be required. In addition, research is needed to support specific implementation so that nature-based solutions can be implemented through private participation in TNFD, a global natural financial information disclosure system.

Keywords: Climate crisis, Biodiversity crisis, Carbon reduction, Ecological wetland, Biological habitat

Research on the Historical Townscape Characteristics along the Shu Road

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The Shu Road is a historical road system that traverses the mountainous regions of the Qinling and Daba Mountains in China, connecting the Central Plains region with the southwestern region. With a history of over 2300 years, the Shu Road was inscribed on the UNESCO World Heritage Tentative List in 2015 due to its magnificent mountainous environment and rich natural and cultural heritage along its route.
Research OBJECTIVE: This study focuses on three representative historical towns along the Guangyuan section of the Jin Niu Road (a segment of the Shu Road), namely Guangyuan, Zhaohua, and Pu'an Town in Jiange County, and aims to analyze and summarize the landscape spatial characteristics of historical towns along the Shu Road through a combined qualitative and quantitative research method.
Research METHODS: The study adopts textual analysis of historical documents, spatial translation of ancient maps based on GIS platforms, and spatial quantification analysis.
Research CONTENT: Based on the systematic analysis of the route's development context, the landscape characteristics of historical towns along the Shu Road are analyzed at three levels: macro landscape space (town development background, natural environment, cultural environment, administrative evolution), meso landscape space (site selection of towns, landscape patterns), and micro landscape space (layout of important cultural spaces, street and alley space, typical landscape nodes).
Research FINDINGS:
1、The historical towns along the Shu Road had already begun to develop during the Warring States Period (circa 475 BCE to 221 BCE). These towns were built in mountainous environments with elevations ranging from 1000 to 3800 meters, mainly nourished by the Jialing River system, and have rich backgrounds in military, religious, navigation, and immigration cultures.
2、The site selection of historical towns was based on convenient water transportation, natural mountain defense advantages, and fertile soil suitable for cultivation in the riverside areas, surrounded by mountains and rivers.
3、The layout of historical towns' urban forms is irregular due to the influence of terrain, with important cultural spaces strategically located in areas with better natural scenery, following traditional Chinese ceremonial layouts. Street and alley spaces show irregular patterns, echoing the surrounding mountainous and aquatic environments.
4、Typical landscape nodes such as Phoenix Towers and White Pagodas were often situated on high ground within the towns or along the riverside, providing excellent vantage points for enjoying the surrounding scenery.
5、The study further proposes protection strategies for historical towns along the Shu Road, focusing on preserving the mountain-water patterns, controlling urban layout, enhancing main landscape corridors, and enriching landscape node scenes.
The study aim to provide a basis and reference for the application for the Shu Road World Heritage designation and the construction of livable urban-rural environments in mountainous areas and the protection of Ba-Shu cultural heritage.

Keywords: Historical Townscape, the Shu Road, Mountainous Urban-rural Environment, Ba-Shu Cultural Heritage, Cultural Route

Figure 1 Selected Historical Towns and Their Locations

The location of the Jin Niu Road and the selected historical towns studied in China.

Figure 2 Landscape Spaces of Selected Historical Towns

The typical landscape spaces of the historical towns studied (base pictures self-photographed by the author).

Figure 3 Spatial Morphology of Selected Historical Towns and Their Associated Features with Surrounding Environments

We employed historical map transcription and spatial quantification methods based on GIS platform to analyze the spatial morphology of selected historical towns and their associated features with the surrounding environment.

Multi-scale landscape character assessment in the Pearl River Delta, China

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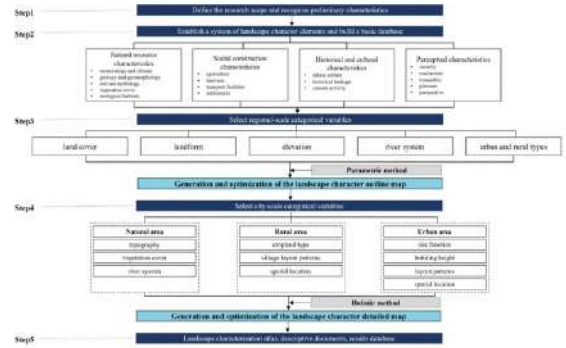
Managing landscape characterisation is an effective way of reacting to the decline of natural environments and the gradual fragmentation of landscapes. It has become a core tool for sustainable development, nature conservation, and land management in several countries and regions. China's Pearl River Delta is one of the fastest urbanizing regions in the world, with a high degree of urban-rural mixing and rich natural landscapes. The research adopted a combined framework of parametric and holistic approaches to identify landscape character types and delineate areas in the Pearl River Delta region at the macro-regional and meso-urban scales. At the regional scale, a parametric method was used to overlay the elevation, land cover, and urban/rural land use datasets to generate 18 landscape character types. Thus, it can present the holistic pattern of transforming the natural environment under the influence of human behavior. At the urban scale, 51 landscape character types are defined based on satellite image maps using a holistic approach while considering factors such as land use, building layout, and agricultural patterns. Thus, it is possible to present subtle differences in the impact of human behavior on different landscape characteristics in urban/rural areas. Through the multi-scale perspective, understand and describe the landscape in the urbanization process, identify the overall characteristics and critical characteristics, and establish a holistic perception of the landscape pattern of the Pearl River Delta. The results also construct a systematic landscape baseline that can provide a nested spatial framework to assist urban and rural spatial governance, landscape conservation, and management in China.

Keywords: landscape character assessment; holistic method; parametric method; landscape baseline; Pearl River Delta

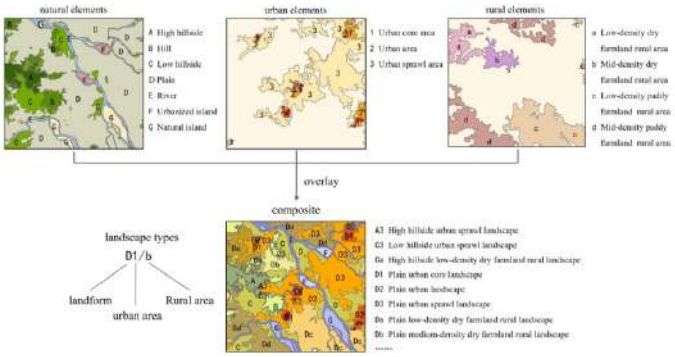
1-Technical routes for classifying landscape characteristics in the Pearl River Delta



The classification of landscape characteristics is a functional hierarchy and the factors of different classification dimensions show scale heterogeneity, which is characterized by an increasing level of detail at the lower levels of the hierarchy when moving from the macro-scale to the micro-scale.The assessment of the PRD should focus on the macro-scale of the region as a whole as well as the meso-scale from the perspective of individual cities, using a combined framework of parametric and holistic approaches. A systematic and structured

comprehension of the overall landscape will be attained through the landscape character outline map and the landscape character detailed map.

2-Identifying landscape character at the regional scale by parametric methods



As the high-precision basic data such as elevation, land cover, and remote sensing imagery are complete at the Guangdong Province scale. Therefore the landscape character assessment at the regional scale of the Pearl River Delta was completed using a parametric approach based on the GIS overlay technique and manual modification. To understand and analyze the landscape features and the way they change as a result of the impact of human behavior on the natural environment at the macro scale.

3-Identifying landscape character at the city scale by holistic methods

Landscape area	Classification dimension		concrete types							
			1	2	3	4	5	6	7	...
Rural Landscape Types (Definition: a+b+c)	a	terrain and spatial location	plain	low hillside	hill	coastal	suburb	urban	...	...
	b	spatial relationship between village settlement and farmland	linear	scattered	reticular	congregate	...	...	...	...
	c	farmland type	paddy farmland	dry farmland	village	mixed	...	...	...	...
Urban Landscape Types (Definition: a+b+c)	d	spatial location	downtown	edge of downtown	suburb	...	...	...	...	...
	e	building height	low-rise	mid-rise	high-rise	...	...	...	...	...
	f	patterns of layout	regular	farious	disordered	modern	older	...	...	...
	g	site function	resident	commercial	industrial	public institution	park&green space	traffic	mixed	...

(Note: "a1 plain" and "d1 downtown" are omitted in the definition of the most common location types, while the "building height" dimension only appears as an emphasis in the definition of residential types.)

Original satellite image
Landscape area identification

d1 + f1 + g3
(downtown) regular industrial landscape

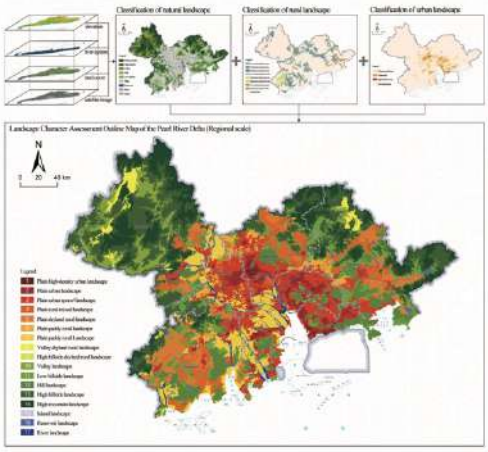
d1 + e3 + f4 + g1
(downtown) modern high-rise resident landscape

a1 + b2 + c2
plain scattered dry farmland rural landscape

Urban-scale landscape type classification needs to be combined with land cover and cultural pattern classification on a regional scale, reflecting the detailed differences in human influence on landscape forms.Based on the overall perception of satellite images of the Pearl

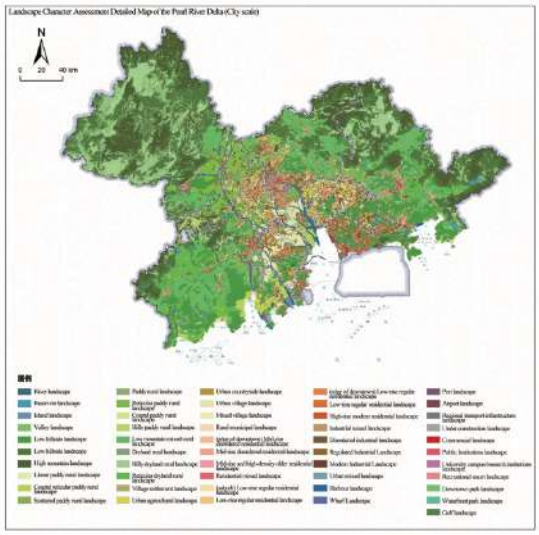
River Delta, a classification framework based on human construction elements is first constructed. Then the detailed landscape types are classified city by city based on the holistic approach of manual visual translation of satellite images.

4-Landscape character assessment outline map of the Pearl River Delta (regional scale)



The Pearl River Delta Landscape Character Outline Map is divided into 17 landscape character types and 1,440 landscape character areas, with an average area of about 32km2. It presents a general pattern of interwoven natural, rural, and urban landscapes.

5-Landscape character assessment detailed map of the Pearl River Delta (city scale)



The landscape character assessment detailed map of Pearl River Delta delineates 51 landscape character types, forming 20,643 landscape character areas. These include 7 natural landscape types, 15 rural landscape types, and 29 urban landscape types. Comprehensive landscape protection and planning management can be promoted based on the analysis and change monitoring of different landscape types.

Discovering public-perceived cultural ecosystem services for Maritime Cultural Landscape management

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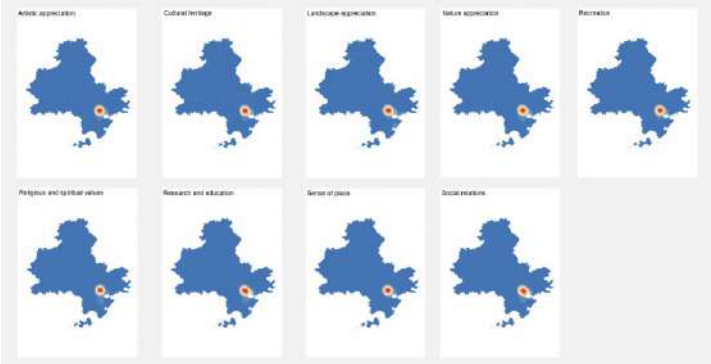
[2]The University of Sydney, Camperdown, NSW

The maritime cultural landscape is a result of interaction between human processes on the coastal surface over time and the environment, which is attracting increasing attention for heritage tourism. This landscape provided various cultural ecosystem services (CES) for people, which are identified as non-material benefits obtained from natural environment that contribute to human well-being, such as recreational, aesthetic value and sense of place. However, there is a dearth of information on CES derived from maritime cultural landscape, reflecting a poor understanding of socio-ecological relationships and the different values various stakeholders assign to these areas. In this study, we assessed the public perceived CES from the maritime cultural landscape in Quanzhou based on analyzing social media photos combined with visual content analysis in deep learning. Based on the geo-tagged images from the Little Red Book, we performed a spatial pattern analysis of tourists and residents' perceptions of CES and explored how their perceptions and preferences related to local landscape features. Our results reveal that tourists are more interested in the natural views and recreational facilities of the waterfront regions, while locals are more dispersed throughout the study area. We also discovered that landscape features make varying contributions to CES categories. For example, historical villages have the highest contribution to cultural heritage value. In conclusion, applying the assessment of CES for maritime cultural landscape management research benefits the enhancement of urban well-being from a public perspective and supports the preservation and sustainable transformation of cultural heritage in coastal cities, which could also provide insights for marine heritage tourism management.

Keywords: Maritime cultural landscape, Cultural ecosystem services, Social media data, Deep learning

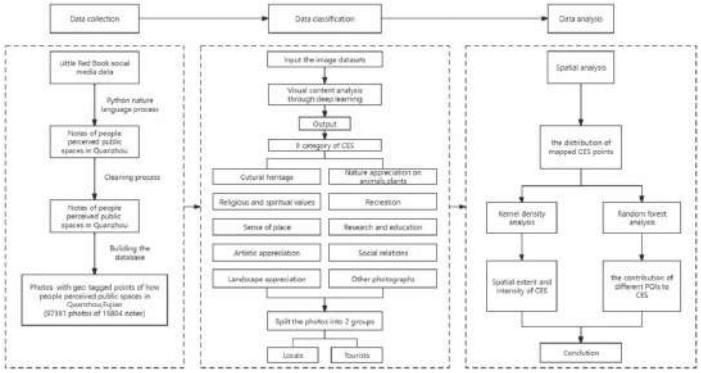
Kernel density analysis: all data group

Kernel density analysis: native people

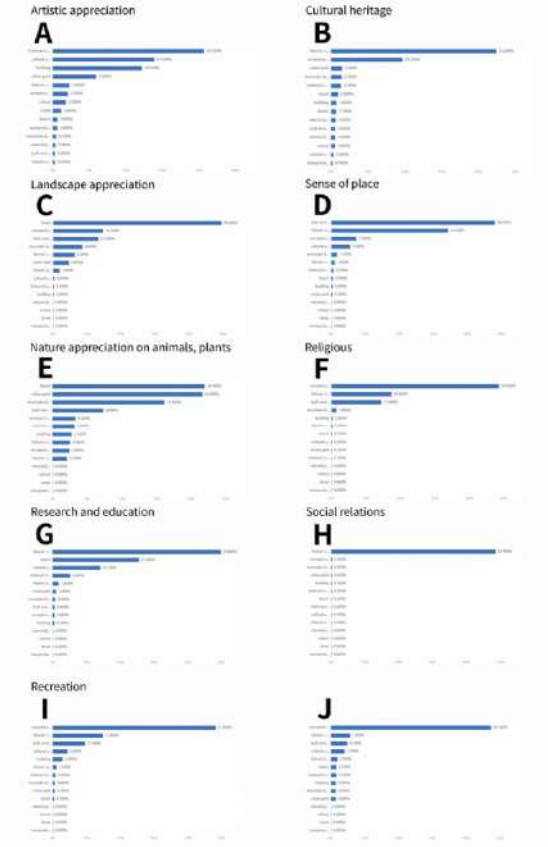


Kernel density analysis: tourists

Method Flowchart



Random forest analysis



Spatial statistical analysis: all data group

Spatial statistical analysis: native prople

Spatial statistical analysis: tourists

Category of CES

Category of CES	Description	Secondary indicators	Example
Cultural heritage	Cultural heritage Photographs depicting tangible cultural and intangible cultural heritage	Tangible cultural heritage	historical buildings, ruins, museums, bridges
		Intangible cultural heritage or products	the hairpin of a flower, the glove puppet shows or products such as chinaware
Religious and Spiritual values	Religious, Spiritual or Ceremonial Activities and Photographs representing religious or		indigenous ritual

	spiritual activities		
Sense of place	Sense of Place Photographs depicting local street scenes or scenes containing memories		roadside stall, buses
Artistic Appreciation	Artistic Appreciation Photographs representing people in artistic activities and places		visiting the Museum of Fine Arts, creative neighborhood, exquisite architectures
Landscape Appreciation	Landscape Appreciation Photographs for which the main focus is a wide and large-scale view of the landscape	Coastal landscape	the sea, sandy shore, pinwheel
		Other landscape	the mountain
Nature Appreciation on animals, plants	Nature Appreciation Photographs focusing on animals, plants or other living organisms		Birds, flowers
Recreation	Photos showing people engaged in recreational activities or photos without people but showing the recreational equipment.	Food recreation	enjoy various food, barbecue
		Coastal recreation	dredge for shells and seafood
		Other recreation	fishing、running
Research and Education	Research and Education Photographs showing research or education activities equipment		researcher, school children or binoculars, traps, notebook

Social Relations	Social Recreation Photographs that represent groups of people in an informal or non-dedicated recreative social environment		Playing with friends, family reunion
Other Photographs	Other Photographs that do not fit any of the above criteria		

POI Types

POIs	CES
Urban park	Natural appreciation
Cultural and creative park	Artistic appreciation
Building	
Built environment	
Recreation place	Social relations, recreation
Street	Cultural heritage, sense of place
Beach	Landscape appreciation
Natural place	Nature appreciation, landscape appreciation
Mountain and hill	Landscape appreciation
Transportation service	
School	
Historic building and bridge	Cultural heritage, religious and spiritual value
Historic village	Cultural heritage, religious and spiritual value, sense of place
Science, culture and education service	Research and education

Is urban park a carbon sink or a carbon source?

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In the context of global climate change, urban green spaces, as significant carbon sink entities, play a crucial and indispensable role in the overall carbon cycle. Green spaces are expected to partially offset carbon emissions generated by urban activities, thereby mitigating the adverse impacts of climate change. Parks constitute an important component of urban green spaces, fulfilling dual functions of ecosystem services and social well-being. Previous studies have focused on the carbon sequestration capacity of green spaces within urban parks. However, due to the operational characteristics of high maintenance management and the demands for public services, the carbon emissions of urban parks cannot be overlooked. Whether urban parks are carbon sources or carbon sinks remains a question for further research. Therefore, our study focuses on assessing the annual carbon balance of urban parks and constructing a framework for evaluating urban park carbon balance.Taking 15 urban parks in Nanjing, China, as case studies, we identified green spaces within urban parks based on high-resolution remote sensing images and obtained Leaf Area Index (LAI) data and species data through on-site measurements. We combined these data to calculate the annual carbon storage of parks. In the calculation of carbon emissions, we constructed an index set and formulas, collected annual maintenance and management data for parks, and separately calculated carbon emissions from green spaces, buildings, and human activities. Ultimately, we obtained carbon balance coefficients for the 15 case studies. The results show that only 7 parks have carbon balance coefficients less than 1, with Hexi Ecological Park having the lowest coefficient at 0.28, indicating high carbon sequestration capacity. Conversely, Mo Chou Lake Park has the highest carbon balance coefficient at 7.71, indicating its inability to provide carbon sequestration services and serving as a carbon source.Contrary to previous understanding, the results of our study suggest that comprehensive parks often exhibit characteristics of carbon sources. This is believed to be associated with the high maintenance management characteristics of urban parks and their functions in providing services to citizens. Additionally, we further revealed the carbon balance characteristics of different types of urban parks, such as waterfront, mountain, and wetland parks, suggesting the need for tailored management and maintenance policies based on the environmental and resource conditions of urban parks, as well as targeted plant renewal optimization. This study provides valuable insights for optimizing the construction and management of urban parks from the perspective of enhancing carbon sequestration benefits.

Keywords: Urban Green Spaces, Carbon Balance Assessment, Carbon Sequestration, Carbon Emissions, Remote Sensing Data

The key factors of carbon sequestration in waterfront green spaces

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In the context of global climate change, urban areas contribute over 70% of total carbon emissions. Therefore, enhancing carbon sequestration and reducing emissions in cities is crucial. Vegetation in urban waterfront green spaces plays a key role as a carbon sink. While previous research has shown water bodies enhance plant carbon sequestration, studies have mainly focused on large scales like river basins and coastlines, with limited research on small to medium-scale urban waterfront green spaces. This study explores how water bodies promote plant carbon sequestration in urban waterfront green spaces and investigates key influencing factors. We selected urban green spaces within a 120m range on both sides of the new Qinhuai River in Nanjing, China, as our research case. A total of 185 green space samples were selected, including 39 waterfront green spaces and 146 non-waterfront green spaces. The leaf area index (LAI) of plants in the sample plots was measured using a canopy analyzer. Based on this, combined with remote sensing image data, the average leaf area index of different green spaces was estimated, and the carbon sequestration capacity of the sample plots was further calculated. Subsequently, the random forest method was used to measure two morphological factors of green spaces: tree canopy coverage and fractal dimension. Additionally, the impact of five water-green spatial relationship factors—ratio of water-green contact length to green space perimeter, water-green distance, water-green width ratio, proportion of the area within 10m of the water's edge, and proportion of the area within 30m of the water's edge—on the carbon sequestration capacity of plants was assessed.
The results showed that the average carbon sequestration efficiency of trees in the study area was 9.8483g/(㎡·d), while the average carbon sequestration efficiency of waterfront green spaces was 17.038g/(㎡·d), and the average carbon sequestration efficiency of non-waterfront green spaces was 16.151g/(㎡·d), indicating that the average carbon sequestration efficiency of waterfront green spaces is higher than that of non-waterfront green spaces. In waterfront green spaces, the ratio of the area within 30 meters of the water's edge had the greatest impact on plant carbon sequestration capacity, with a value of 0.7831. The impact of water-vegetation width ratio, the ratio of the area within 10 meters of the water's edge, fractal dimension, tree canopy coverage, and water-vegetation contact degree on plant carbon sequestration capacity were 0.2761, 0.4581, 0.2023, 0.0945, and 0.0402, respectively. In non-waterfront green spaces, tree canopy coverage, fractal dimension, and water-vegetation distance were the three most important influencing factors on plant carbon sequestration capacity, with values of 1.6676, 0.2829, and 0.2358, respectively.
This study proves that water promote the carbon sequestration capacity of urban greenery. For waterfront green spaces, the proportion of area within 30 meters of the water's edge is is the key factor affecting plant carbon sequestration capacity, while tree canopy coverage is paramount for non-waterfront green spaces. Based on this, we propose optimization strategies for urban waterfront green spaces to enhance carbon sequestration benefits and support high carbon sequestration planning and design.

Keywords: Urban waterfront spaces,Green space,Carbon sequestration,Random forest,Remote sensing data

Adapting to climate change: a new terrapin habitat projection model

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Global climate change is adversely affecting our planet, notably seen in rising sea levels and their detrimental impact on biodiversity. Sea level rise poses a direct threat to low-lying coastal areas, causing inundation, erosion, and habitat loss for numerous species. Crucial coastal habitats for various species are diminishing. The town of Stone Harbour lies in a representative low-lying coastal area in New Jersey. This study focuses on the Wetland Institute and its surrounding area, the frontier site of the Stone Harbour coastline, to explore local habitat adaptation to sea level rise. The Malaclemys Terrapin, or Diamondback Terrapin, serving as both a predator and prey in the local food chain, plays a pivotal role in the coastal ecosystem and reflects the health of New Jersey's shoreline biodiversity. By predicting habitat change of Diamondback Terrapin, this study develops a relatively transferable analysis to predict habitat change for similar indicator species in coastal habitats.

This research aims to develop an innovative Habitat Suitability Index (HSI) Model (figure 1) based on the preliminary work done by William Palmer and Carroll Cordes (1988), which incorporates variables such as shrub and grass canopy cover percentages and mean slope of sandy substrates. Expanding upon this, our study enhances the model with five additional factors: bathymetry, vegetation structure, temperature, salinity, and particularly the influence of sea level rise. Leveraging multi-scale and multi-spectrum data, the model anticipates future habitat alterations spatial-temporally under various sea level rise scenarios over the next 50 years. Furthermore, utilizing remote sensing data from Landsat and drones (figure 2) and employing the SLAMM Model (Simple Linear Assessment and Mapping Model), we conducted a series of quantitative mappings at both regional (figure 3) and local scales (figure 4). This enabled us to predict general inundation patterns and pinpoint precise locations of Diamondback Terrapin habitat loss over a 50-year time frame.

This research presents an integrated and standardized methodology employing Landsat and drone data for anticipating alterations in Diamondback Terrapin habitat resulting from sea level rise. The findings can guide the Wetland Institute in implementing a sustainable conservation strategy for this vital species. The approach developed in this research sheds new light on forecasting potential impacts of sea level rising on analogous indicator species, preserving coastal biodiversity in response to climate change.

Keywords: Sea Level Rise, Habitat Suitability Index (HSI) Model, Diamondback Terrapin, Biodiversity, Coastal Landscape Adaptation

Figure 1: Workflow of the new model

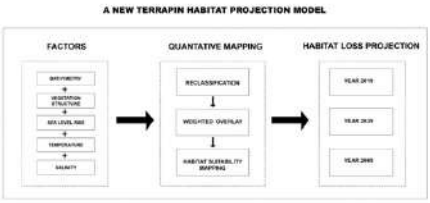


Figure 2: Point cloud modeling

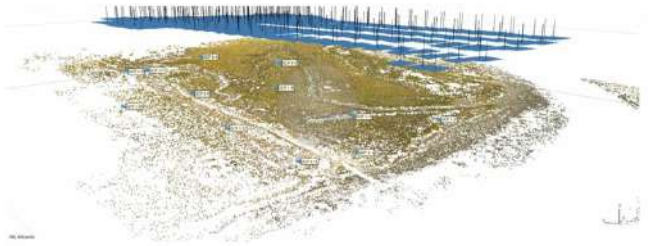


Figure 3: Regional-scale results

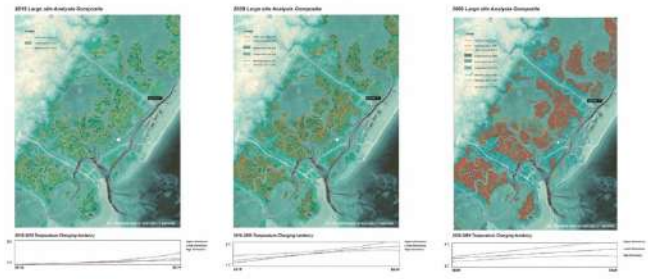
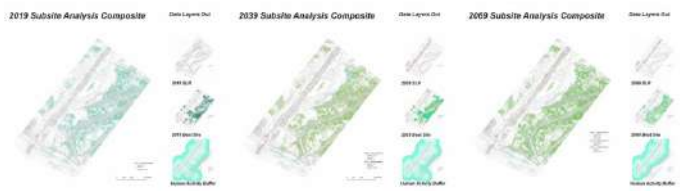


Figure 4: Local-scale results



Transformative Landscape Design for Carbon-Neutral Camping Experiences

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[2]Harbin Institute of Technology

Sustainable Horizons: Transformative Landscape Design for Carbon-Neutral Camping Experiences at Lake Eildon Park

In the contemporary era, camping has blossomed into a universally favored method of relaxation, attracting enthusiasts seeking a harmonious connection with the great outdoors. This paper delves into the dynamic landscape of camping, addressing urgent environmental challenges linked to this increasingly popular recreational activity. The focus is particularly set on the pressing issues of waste generation and carbon emissions, observed amidst the serene landscapes of Melbourne's Lake Eildon Park.

Against the idyllic backdrop of Lake Eildon Park, a renowned camping destination in Melbourne, the research unfolds as a comprehensive investigation into the intricate interplay between recreational activities and environmental stewardship. The study emphasizes the escalating ecological threats posed by the mounting accumulation of waste and carbon emissions resulting from conventional camping practices, casting a spotlight on the critical need for sustainable solutions.

The primary aim of this research transcends mere analysis; it aspires to conceptualize and implement landscape design interventions that not only mitigate the adverse impacts of camping but actively engage campers in the noble pursuit of carbon neutrality. The research envisions a transformative shift in the traditional camping paradigm, advocating for a sustainable and ecologically responsible approach where campers become conscientious stewards of the environment.

Methodologically, the research employs a multi-faceted approach, commencing with a meticulous site analysis of Lake Eildon Park. This includes a comprehensive evaluation of existing camping practices, waste management systems, and the identification of carbon emission sources. Simultaneously, an exhaustive review of pertinent literature on sustainable camping practices, landscape design principles, and carbon sequestration mechanisms informs the development of innovative design strategies.

Furthermore, the study incorporates a vital aspect of stakeholder engagement. Park management, campers, and environmental experts are actively involved to ensure a diverse array of perspectives and insights. Through collaborative workshops and surveys, the research aims to delve into camper preferences, behavior patterns, and perceptions regarding sustainable camping practices, creating a holistic understanding of the camping community's needs.

In conclusion, this research strives to offer not only novel insights but also practical solutions for achieving carbon neutrality in camping sites. The integration of landscape design with

active camper participation is poised to pave the way for a sustainable future at Lake Eildon Park, setting an inspiring precedent for other recreational areas grappling with similar environmental challenges. As the sun sets on conventional camping practices, this study seeks to usher in a new dawn of ecologically responsible camping experiences.

Keywords: Camping, Environmental Stewardship, Waste Management, Carbon Neutrality, Landscape Design

Ecological effects of invasive species on migratory bird communities

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Biological invasions strongly alter the biotic and abiotic characteristics of ecosystems, thereby affecting native vegetation, insects, mammals, birds, and many other taxa, and are currently one of the most significant causes of biodiversity loss. The typical smooth cordgrass （Spartina alterniflora）is the most widely impacted invasive alien species in coastal zones globally, significantly altering coastal wetland ecosystems and profoundly affecting other taxa. Migratory birds, at a higher trophic level in the ecosystem, are sensitive to habitat changes caused by the invasion of the typical smooth cordgrass. The degradation of migratory bird habitats and ecological impacts due to the invasion of smooth cordgrass have attracted long-term and widespread attention worldwide. The coastal wetlands in the eastern part of China are located along the migratory route of migratory birds from East Asia to Australasia and are an important stopover site for many rare migratory birds. The invasive smooth cordgrass has invaded and developed in several coastal wetlands, forming dominant communities and significantly altering the distribution pattern of vegetation and migratory birds in the region. It has been shown that the invasive smooth cordgrass can disrupt the homeostasis of migratory birds in terms of habitat, food resources, and other aspects. However, as the history of the invasion grows, the habitat of invading smooth cordgrass also provides blank ecological niches for some migratory birds, which enriches the diversity of local species to a certain extent. Therefore, this study scientifically classifies migratory bird taxa according to their ecological habits and habitat strategies, predicts the distribution and development trends of invasive and native species through ecological niche modeling, and explores the distribution and changes in the habitat of different groups of migratory birds in the process of invasion and development. At the same time, this study investigates the correlation between communities in different invasion periods, systematically identifies the positive and negative effects of the invasive smooth cordgrass on migratory bird communities, and then provides theoretical support and practical reference for the scientific management of the invasive smooth cordgrass in different regions.

Keywords: Spartina alterniflora,Migratory bird

Excavation Management: less CO2, truck movements and a new park

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Climate protection through sustainable construction is one of the future topics that will increasingly concern open space planning. The possibility of reducing road traffic and thereby saving CO2 by dealing with excavated soil, especially when excavating construction pits, has so far been largely underestimated and rarely implemented by us landscape architects.

To date, it has been common practice for measures involving soil excavation in large quantities (building construction, civil engineering, etc.) to remove the resulting material and transport it to the nearest landfill suitable for filling with the respective soil. In addition to the transport costs, this sometimes causes enormous movements by the transport vehicles, which on the one hand puts a strain on the road space and on the other hand results in high CO2 emissions. Fossil energies are consumed and backfill space, which is also a limited resource, is taken up.

This procedure may well be necessary and correct due to local conditions such as confined property conditions, degree of contamination of the existing soil, etc. However, as landscape architects we should always check whether an alternative, sustainable way of dealing with the resulting soil material is possible.

The following example is to illustrate how we as open space planners can make a good contribution to reducing CO2 emissions and thus to climate protection through forward-looking and innovative planning with the courage to make changes.

At the Wasserburg Clinic in Upper Bavaria, it was possible to model a generously sized earth plateau on the owner's adjacent hillside property and to create a landscaped green area with a flowing transition to the adjoining, attractive foothills of the Alps.

The excavation of the first construction phase with approx. 90,000m³ has already been carried out. A total of 163,000m³ of excavated material will be installed in three construction phases. This means that around 22,000 truck journeys and around 2 million kilometers of transport routes can be saved, which prevents CO^2 emissions of around 3,000 tons.

The installation was planned in such a way that after the soil material from the first construction phase had been introduced, the newly created areas could be finally modeled and completed as a landscaped park. This area of approximately 1.5 hectares is already being used by patients and visitors as an open space for recovery and socializing. The park has also established itself as an interesting excursion destination for the local population with a brilliant view of the foothills of the Alps.

Keywords: excavation management, resource conservation, landscape creation

Picture 1

Installation of excavated material

Picture 2

Installation of excavated material

Picture 3

View over the finished modeling

Picture 4

just completed park

Picture 5

completed park

Social-media photographs and deep learning for cultural ecosystem services assessment

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Context
In the high-density urban context, urban green spaces play a crucial rolein enhancing local human well-being. Managing urban green spaces in high-density metropolitan areas poses significant challenges due to the scarcity of spatial resources.. In the pursuit of efficient governance, it is imperative to recognize and assess the cultural ecosystem services (CES) provided by urban green areas. These CES encompass the benefits and emotional connections that individuals derive from urban green spaces.

OBJECTIVE: Focusing on central Beijing as the case study, we addressed four key questions: (1)How to use social media photographs combing with deep learning to assess public perceived CES efficiently? (2)What's the spatial pattern of the CES that people perceived in central Beijing?(3) Which kind of CES is most perceived by the public and(4) How does this CES relate to current urban green and blue spaces in central Beijing?

Method
We utilized geo-tagged digital images that locals uploaded to the Littleredbook website in order to identify spatial patterns of CESs that people perceived in central Beijing.. Using image analysis with deep learning, social media photos were classified into nine categories of CESs. The nine CESs were analyzed using a combination of contingency tables, kernel densities, and random forest analyses, in addition to human-made and natural landscape features, including various POI categories. Results were discussed in context of other CES spatial mapping and assessment studies' findings.

Result
Social Recreation was the main CES perceived by people in central Beijing, followed by natural appreciation while few photographs depicted educational engagement. The spatial distribution of these CESs is associated with different social and biophysical landscape features, such as the presence of vegetation types and recreational attractions in central Beijing. Meanwhile, the social recreation values are provided more by micro-green spaces in built-up areas than by urban parks and forests.

CONCLUSION: Our results demonstrate that combing deep learning and social media photographs is useful for assessing cultural ecosystem services at the megacity scale. These findings could help urban planners to approach public perceptions in relation to socio-cultural and bio-physical landscape features comprehensibly, to foster more effective and inclusive urban green spaces management strategies in the high-density urban context.

Keywords: Cultural ecosystem services, Social media photographs, Deep learning, Urban green spaces, Landscape sustainability

Case study area

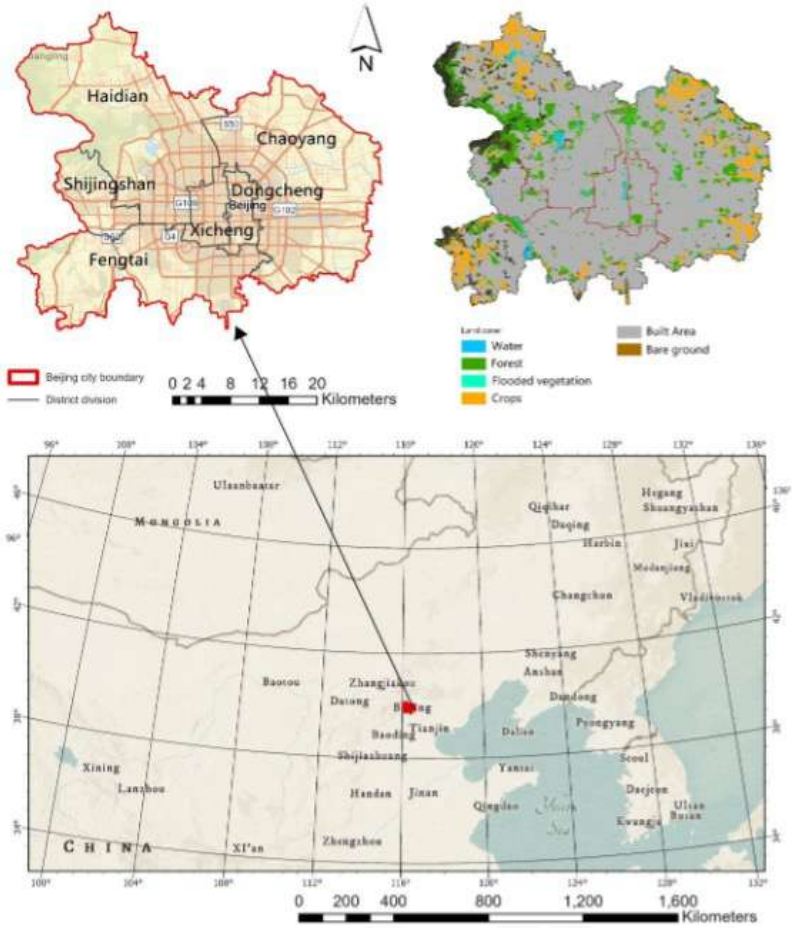

Figure 1 Location of the central Beijing in China and the land cover features.

Methodology

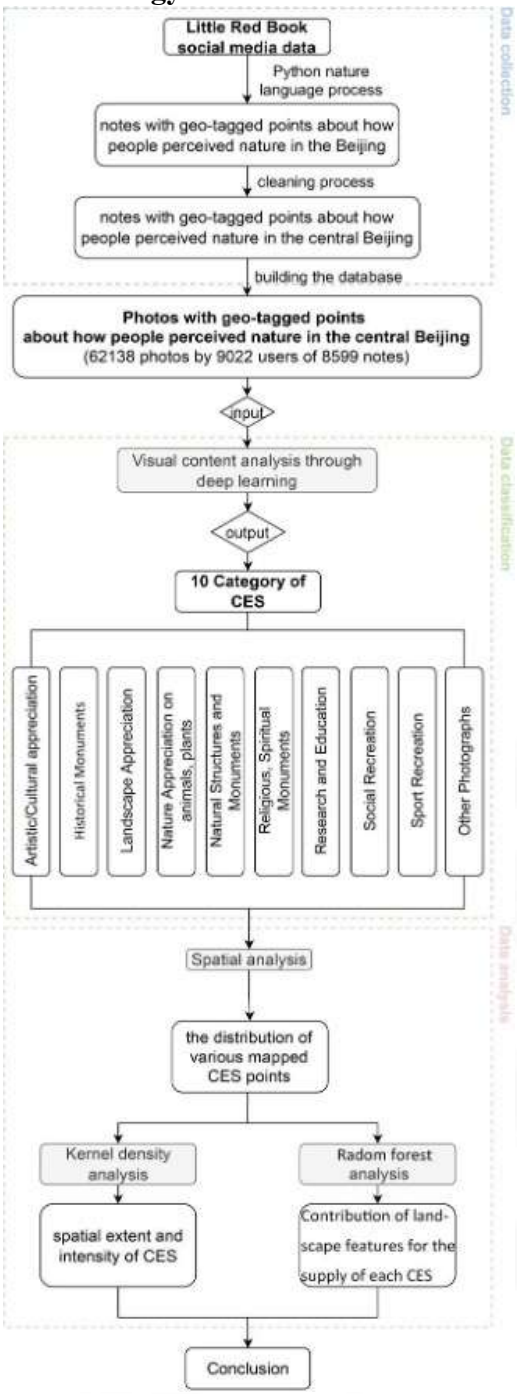

Figure2. Framework of the study

Result 2: The contribution of each landscape features to public perceived CES

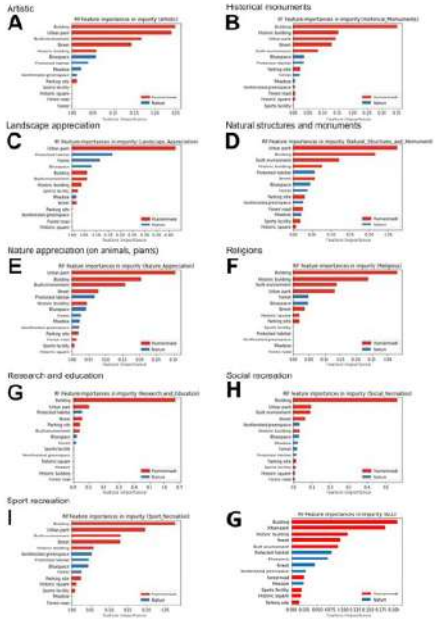

Figure4.(A-I): Each landscape features' importance plots for all kind of CES. Plots were derived from random forest models (%IncMSE is the increase in mean of the error of a tree).

Result1:Spatial distribution of CES in each street block in central Beijing

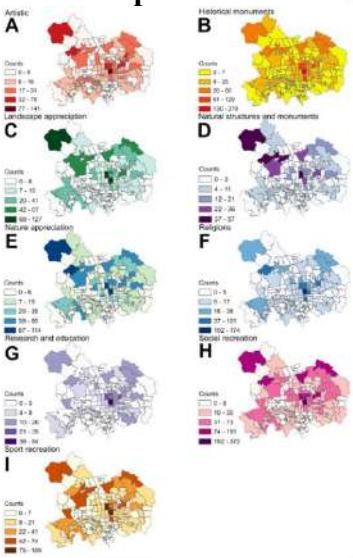

Figure3. Spatial distribution of CES in each street block in central Beijing. A) – I) each individual CES.

Table1: Typology of cultural ecosystem services

Category of CES	Description
Artistic and cultural appreciation	Artistic and cultural appreciation Artistic or Cultural Expressions and Appreciation Photographs representing people in artistic activities (e.g. painter, sculptor), cultural activities (e.g. artisanal fisheries,folk dancing) or their products (e.g. painting, pottery)
Historical Monuments	Historical Monuments Photographs depicting historical infrastructure (e.g. historical buildings, ruins)
Landscape Appreciation	Landscape Appreciation Photographs for which the main focus is a wide and large-scale view of the landscape
Nature Appreciation on animals, plants	Nature Appreciation Photographs focusing on animals, plants or other living organisms
Natural Structures and Monuments	Natural Structures and Monuments Photographs depicting a specific and well-designed landscape structure (e.g. waterfall, cave)
Religious and Spiritual values	Religious, Spiritual or Ceremonial Activities and Monuments Photographs representing religious or spiritual monuments or activities (e.g. church, indigenous ritual)
Research and Education	Research and Education Photographs showing research or education activities (e.g. researcher, school children) or equipment (e.g. binoculars, traps, notebook, etc.)
Social Recreation	Social Recreation Photographs that represent groups of people in an informal or non-dedicated recreative (i.e. not sport) social environment
Sport Recreation	Sports recreation Photographs presenting one or more individuals in a dedicated sport activity

Table2: Typology of cultural ecosystem services

Table2. Spatial clustering of individual CES through NN analysis.

	Artistic/ Cultural appreciation	Historical Monuments	Landscape Appreciation	Nature Appreciation	Natural Structures and Monuments	Religious, Spiritual Monuments	Social Recreation	Research and Education	Sport Recreation
p	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
z	-74.81	-86.55	-94.12	-97.63	-63.36	-71.79	-130.20	-48.27	-97.41
Observed distance	212.62	162.98	128.41	128.07	233.86	230.35	84.88	491.39	127.38
Nearest Neighbour ratio	0.13	0.11	0.09	0.10	0.12	0.14	0.09	0.22	0.10

The spatial clustering of all nine types of CES was statistically significant (p 0.001, nearest neighbor ratios: 0.09-0.22, z-scores: -130.20 to -48.27)

Urban afforestation against biodiversity loss: integrating design in science experimentation

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Department of Architecture and Urban Studies, Politecnico di Milano, Milan, Italy

In 1992, the United Nations held the Conference on Environment and Development in Rio de Janeiro, laying the groundwork for international cooperation to halt the escalating biodiversity loss on the planet. However, over the past 30 years, biodiversity loss has increased, triggering a growing sense of urgency. Among various approaches addressing this issue, afforestation is one of the most widespread. This is evident in the European Green Deal's Biodiversity Strategy, which aims to plant 3 billion trees in Europe by 2030 among its various objectives. This “Red code” condition calls for the expertise of professionals capable of proposing efficient and effective solutions, often prioritizing performances and correspondence to a given set of parameters and, consequently, overshadowing less tangible, more difficult-to-quantify aspects, such as diversity of uses or fruitful relationships with the contexts. This tends to render afforestation projects mainly technical operations.
This strategy may perhaps find resonance in projects away from human fluxes; however, operating in urban contexts represents a crucial opportunity to enhance public awareness of environmental issues. This would benefit from the expertise in landscape architecture, a discipline that is used in navigating the tools of aesthetics, communication, and human experience. In Italy, the “Urban Biodiversity” spoke of the National Biodiversity Future Center (NBFC), funded by the European Union Next Generation EU, is a research center working on the increase of biodiversity in urban areas. It involves several universities and public and private entities. One of the research groups, which includes the authors of this contribution, has addressed these issues through a multidisciplinary team conducting an afforestation and biodiversity increase experiment in three areas of the metropolitan city of Milan. While incorporating the necessary measures for obtaining scientific data - the core of the experiment - such as repetition, standardization, and randomization, the project has integrated considerations of spatial quality, such as composition, aesthetics, and relationship with the context. This was achieved within a multidisciplinary environment, through composition, a reorganization of planting layouts in line with botanists' needs, and through the relations of the plantation schemes with the surrounding urban features, such as rural areas, residential zones, and schools and warehouses.
Additionally, the project incorporated the need for mechanized maintenance in the design of the afforested areas, allowing easy maneuvers for vehicles and maintenance without sacrificing spatial quality. This contribution will describe the project's role in the afforestation experiment and how landscape architecture has collaborated in a multidisciplinary field and identified several opportunities while also responding to the technical-scientific goals.
The primary focus of this contribution will be to outline the possible role of landscape design and the communicative potential of composition and aesthetics for urban afforestation projects, indicating possible developments and critical points to focus on given the significant and growing interest in this type of intervention in the years to come.

Keywords: Biodiversity, Afforestation, Aesthetics, Experimentation, Multidisciplinary

Spatial Patterns of Brownfield Clusters in Resource-Exhausted Cities, China

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[2]Tsinghua University

In the post-industrial era, the decline of heavy industry and traditional manufacturing in many cities has led to the closure of numerous factories and enterprises, resulting in the formation of brownfields. These brownfields often exist in clusters within certain areas, rather than individually. We refer to this phenomenon as brownfield clusters, which are geographically associated parcels of land characterized by shared resources such as raw materials, production lines, and transportation.

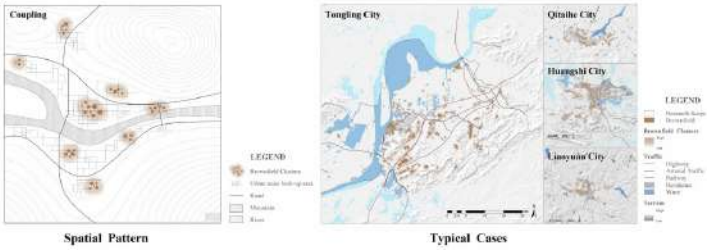
To investigate this phenomenon, we conducted a study focusing on 10 typical resource-exhausted cities in China. First, brownfield identification was conducted in Google Earth Pro based on multi-source information and over 3,000 brownfields sites has been identified. Second, by using the kernel density analysis method, we analyzed the spatial relationship between brownfield clusters and cities, as well as the spatial distribution logic within the brownfield clusters.

Our findings reveal three types of relationships between brownfield clusters and cities: coupling, juxtaposition, and encircling. Additionally, we categorized the spatial characteristics of brownfield clusters into five types including shared mountain, shared river, shared road, shared policy, and compound type. We concluded that the spatial distribution of brownfield clusters in resource-exhausted cities in China is influenced by factors such as mountains, water bodies, transportation, and policies. Finally, we propose regeneration strategies tailored to different types of brownfield clusters.

Based on the regional perspective of "brownfield clusters", the brownfield regeneration challenges faced by resource-exhausted cities could be reinterpret beyond the common "site by site" in practice. This research enriches our understanding of the spatial characteristics of brownfields in resource-exhausted cities in China, and also provides implications for other regions worldwide where the phenomenon of brownfield clusters exists, such as Rust Belt cities and the Ruhr.

Keywords: Brownfield Clusters, Resource-Exhausted Cities, Spatial Patterns

The Coupling 'City-Brown' Spatial Pattern and Typical Cases

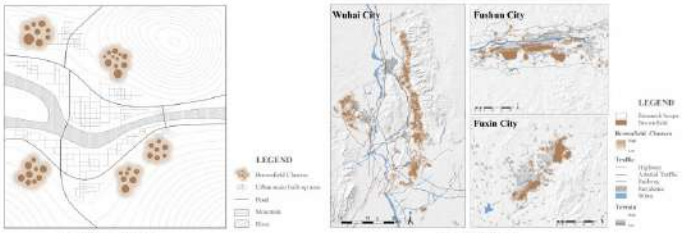


Spatial Pattern Typical Cases

The Encircling 'City-Brown' Spatial Pattern and Typical Cases

Spatial Pattern Typical Cases

The Juxtaposition 'City-Brown' Spatial Pattern and Typical Cases



Spatial Pattern Typical Cases

Urban blue-green space contribution to mitigation of particulate matter pollution

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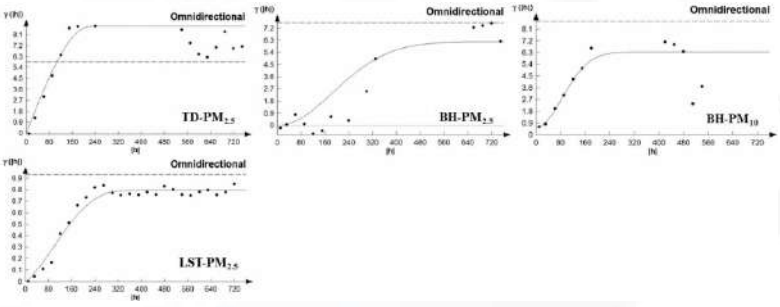
Abstact. This research targets the critical knowledge gap concerning how different stressors and their interactions affect the removal of particulate matter (PM) by urban blue and green ecosystems consists of greenery, lake, river, etc. Using Wuhan city, China as study area, we investigated and modeled the spatial co-variation of stressor intensity and indicators of biofiltration processes. First, we used a GIS framework and geospatial modelling of public data and supplemental field measurements to identify the stressors including traffics (TD), building density (BD), build height (BH), impervious surface (PLAND_I) and land surface temperature (LST) and map their intensities. Along gradients of the major stressors, key processes of PM removal were quantified using well-established indicators of ambient PM levels. The combinations of stressor and ecological indicators were used to identify and subsequently model the type of stressor interactions. Principal component analysis was used to explain urban stressors and the contribution made by urban blue and green space to PM removal in order to regulate land use to reduce the proportion of areas affected by stressors and that consequently have low ecological functionality. The results showed that stressors of LST, TD, PLAND_I and their interactions had a significant impact on PM2.5 within the small-scale spatial range (60-600 m, the spatial range varied with the area of blue-green space in seasons, the same below), while BH, TD and PLAND_I impacted significantly on PM10; in the mesoscale spatial range (150-1200 m), stressors of LST, TD, BH, PLAND_I, BD and their interactions showed a strong impact on PM2.5, while TD and BH impacted on PM10 significantly; in the large-scale spatial range (210-1500 m), stressors of TD, PLAND_I, LST, BH and their interactions had a significant impact on both of PM10 and PM2.5. The results will be of both fundamental and applied interest and will be disseminated to the scientific community and relevant stakeholders.

Keywords: natural based solutions, urban blue-green space, particulate matter pollution, mitigation, urban realistic stressors

Cross-variogram of urban stressors and PM10,2.5 levels in green space surrounding Northwest Lake in winter



Research Review on Urban Insect Pollination Habitat and Construction

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Pollinators are an important part of biodiversity, but they are facing a crisis of population decline and diversity loss due to habitat destruction and inappropriate human management. At present, scholars in some countries and regions have carried out many studies on the importance of pollinator habitats and their protection. Insect pollinator gardens with multiple functions, such as protecting urban biodiversity and promoting nature education, have emerged in different regions. Based on a systematic review, we summarized and refined the existing research on the planning and design methods and management strategies of urban insect pollinating gardens. A total of 400 studies were retrieved through the Web of science core database using two sets of key words related to pollinators and planning and design. Most of the studies were conducted in North America and Europe. The results showed that: 1) In urban master planning, designers should pay attention to the systematic integration of pollinator habitats with urban master and special planning. We proposed four planning principles, including building a regional ecological network, planning multi-scale green space, connecting linear habitat space, and balancing different types of green space. 2) In the detailed design, the selection of plants should follow the principles of "double heights", "locality" and "diversification", adopt the configuration of "high-density group plants" and "windbreak and sunshine", and advocate the combination of landscape facilities to create diversified wild habitats. 3) In the integrated management, a number of management measures should be implemented, including controlling invasive plant species, avoiding chemical control, reducing removal of cover such as leaves, and actively spreading the protection concept of pollinator insects. At the same time, it is necessary to pay attention to the important role of policy support from management departments in achieving the goal of insect diversity. The current review emphasizes that the planning and construction of pollinating gardens can effectively alleviate the crisis of plant pollination. However, the species and behavior of pollinators vary greatly in different regions.

Keywords: landscape architecture, biodiversity, Pollinator habitat restoration, landscape planning and design

Turning the Tide: Ethnic Aging and the Fight Against PM2.5

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BACKGROUND: Over the past two decades, the aging of ethnic minority populations in China has deepened, leading to an increase in deaths and diseases attributable to air pollution. Particularly in the Sichuan-Chongqing region, PM2.5 pollution poses a significant threat to public health. Despite the United Nations' emphasis on protecting ethnic minorities as a critical component of achieving Sustainable Development Goal 3, aimed at significantly reducing deaths and diseases caused by air pollution, research on the distribution of health burdens from air pollution reduction among ethnic minority populations against the backdrop of aging remains scarce.

PURPOSE: This study aims to use a comprehensive assessment model to estimate the changes in deaths attributable to PM2.5 pollution in the Sichuan-Chongqing region from 2000 to 2050 and to explore the potential impact of limiting the aging rate of ethnic minorities on reducing PM2.5-related deaths.

METHODS: A combination of the GAINs-Asia model, the GEMM model, and the LMDI model was employed to analyze the changes in deaths attributable to PM2.5 in the Sichuan-Chongqing region from 2000 to 2050 and to identify the drivers of these changes. The study simulated the impact of PM2.5 emissions, population structure, energy structure, and air control policies on PM2.5 attributable deaths (PAD), with a focus on controlling the aging rate of ethnic minorities.

RESULTS: The findings indicate that keeping the average annual growth rate of ethnic minority aging to less than 3.5% over the next 30 years could prevent approximately 2.2 million deaths due to PM2.5 pollution in the Sichuan and Chongqing regions, which is equivalent to offsetting 64.8% of the potential pollution-related death risk of the projected birth population. Simulations under different scenarios revealed that moderate control of population structure, energy structure, and air control policies could optimize PAD control. The most significant reduction in PAD in all scenarios demonstrated the importance of controlling the aging rate of ethnic minorities in reducing deaths related to PM2.5.

CONCLUSION: Through a comprehensive evaluation model, this study effectively analyzed the PM2.5 pollution issue and its impact on public health in the Sichuan-Chongqing region, highlighting the significance of controlling the aging rate of ethnic minorities in alleviating the health burden of air pollution. The results provide a scientific basis for formulating air quality improvement strategies and health interventions, making a significant contribution to achieving Sustainable Development Goal. While this study specifically focuses on the Sichuan-Chongqing region as a paradigmatic case, the implications of our findings transcend regional boundaries, offering a valuable framework for understanding and addressing analogous environmental health challenges on a global scale. By elucidating the intricate relationship between the aging of ethnic minority populations and PM2.5 pollution-related mortality, our research contributes to a broader discourse on sustainable public health

strategies. Consequently, our study underscores the universality of environmental health issues and the imperative for international collaboration in formulating and implementing solutions that safeguard public health against the backdrop of air pollution and demographic shifts.

Keywords: PM2.5 Pollution, Ethnic Minorities, Aging Population, Air Quality Management, Public Health

Landscape Heritage preservation: vernacular spa revitalization through Community Design

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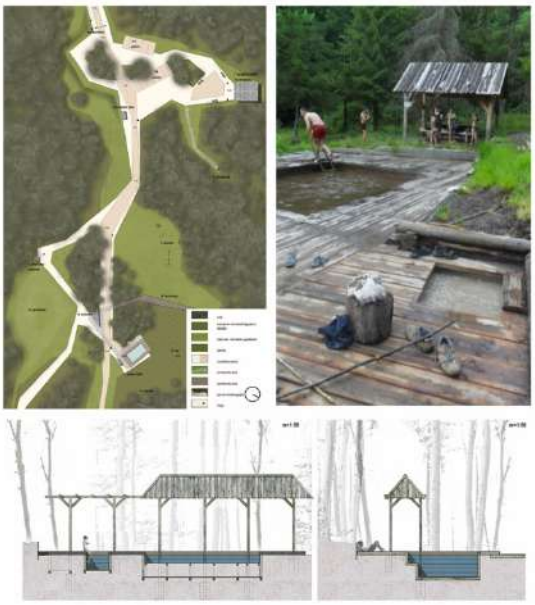
The mineral water springs with healing properties are of particular local and global importance. The therapeutic use of the mineral waters has been prevalent in Europe from ancient times to the present day. This spa culture, in all its variety and different local flavours, can truly be considered an unique European heritage. For centuries, the medicinal properties of the mineral waters of Transylvania (Romania) have been regularly used by the local residents, as a part of the relaxation and cleansing after working in the fields. Over the centuries, it has become part of daily routine as a natural remedy that stimulates circulation and metabolism, regenerates muscles and reduces arthritic pain, and its curative effects have contributed to the development of respect for nature and the need to preserve and maintain the natural environment over generations. In addition to their consumption, small and larger vernacular baths were built in the settlements with medicinal springs, and their regular use led during the 19th and 20th centuries to the development of a traditional, local cold-water bathing culture. However, the vernacular baths were destroyed in the world wars, and their traditional use was abolished. After the political and social changes from the 1990's, the attention of the society turned back to tradition and values. As part of nature and landscape conservation initiatives, the reinterpretation and restoration of the intangible and practical values of vernacular baths in Transylvania also began. Over the past decades, the renovation of vernacular baths, which started as a professional-civic initiative, has grown into an independent heritage conservation programme: dozens of vernacular baths have been renovated with public participation initiated and led by professionals and universities. In the course of the renovations, baths used by local communities have been rebuilt using nature- and environment-friendly techniques, materials in a way that they are also related to the physical environment and the mythology of the region. The project has won prestigious awards both in Romania and internationally, and has become a successful and exemplary movement in sustainable water presrvation and landscape heritage renewal.

Keywords: landscape architecture, sustainable land use, cultural heritage; community building

Plan and resuklts _ example 2



Plan and results _example 1

Realisation

Results

Sustainable Drainage Systems in Urban and Rural Landscape Design

Türkan Erdem
Türkan Erdem Landscape Architecture And Design Studio

Purposes; This study analyzes landscape architects' design principles of urban and rural landscape drainage systems, their role in the integration of infrastructure and superstructure, and sustainable design practices.

Methods; Based on landscape drainage systems designed and implemented in a wide range of geographies and climates from the Arctic (Chukotka and Yamal Autonomous Okrug) to the equator line (Middle & South Africa), reference projects were sampled with details of projects in 2 extreme geographical conditions.

Results; Due to changing precipitation regimes, it is becoming more and more difficult for water to reach societies every year, yet the water that does reach is not protected!
With the increase in concretization, construction and impermeable surfaces, urban infrastructure systems built on the principles of collecting surface runoff water and directing it to manholes are rapidly losing their functions. Climate change and the resulting flood/avalanche disasters are screaming at mankind to return to the most primitive and simple methods by which nature provides its natural cycle.
Drainage systems based on the principles of increasing permeable surfaces, harvesting rainwater and feeding ground water should be urgently adopted, urban and rural landscapes should be planned and designed with these principles.
In the design of the future and the future world, sustainable ecologically based drainage systems should be among the priority design principles of Landscape Architects instead of the drainage systems that have lost their usual function. It should also be a duty to inform and direct all interested parties involved in the project process (employer, investor, architect, engineer, local administration etc.) to these systems.
Change is only possible when the necessary majority of the society accepts, adopts and takes action. Sustainability can only be achieved in this way.

Implications; Our romantic walks in the rain accompanied by songs turn into death walks due to natural disasters! We are dying more and more every day due to sudden rainfalls and floods.
We must give up our struggle with nature, where we are losers not winners!

Keywords: urban landscape, rural landscape, landscape design, drainage systems, permeable landscape

Ecological Niche Identification and Habitat Protection in Uludağ National Park

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While human-induced land use changes and global climate change have inflicted severe damage upon biodiversity, they have concurrently rendered ecosystems more fragile. These impacts have significantly compromised plant biodiversity and heightened the vulnerability of numerous species. Despite the awareness of nearly 600 species having gone extinct worldwide in the last 250 years, it is estimated that approximately 20-39% of plant diversity remains at risk of extinction. Turkey, with its diverse climate, topography, and geological structure, harbors approximately 12,000 taxa, boasting an endemism rate of over 30%.
This study aims to protect 11 endemic species ex-situ within suitable habitats located within Uludağ National Park's boundaries and the area designated as the 'Uludağ Area Directorate' since 2023. Initially, endemic and endangered species within the specified area were identified. Subsequently, utilizing literature and digitized topographic data, habitat, elevation, aspect, slope, soil, rock structure, and precipitation data were incorporated into the ArcGIS environment. A 'Suitability Analysis' was conducted for the ex-situ protection of the identified species, utilizing the 'Weighted Overlay' method. Experts' opinions were sought to determine the weights of habitat, elevation, aspect, slope, soil, rock structure, and minimum temperature data employed in the analysis. The lapse rate method was utilized in determining minimum temperatures.
In the final phase of the study, suitable habitats for plants categorized as endemic and endangered were pinpointed. While suitable areas were identified for nine species outside the jurisdiction of the Uludağ Area Authority, located within Uludağ National Park's boundaries, the Galium olympicum Boiss and Achillea multifida Boiss species were exclusively found within the Uludağ Area Authority. The study's outputs are invaluable in their contribution to the preservation of these 11 endemic species through ex-situ conservation, as well as in the expansion of vegetation areas and the promotion of sustainability.

Keywords: Biodiversity, Uludağ National Park, endemic, ecological niche, ex-situ conservation

Landscape sustainability of the hilly Southeast China based on PLUS-ESV

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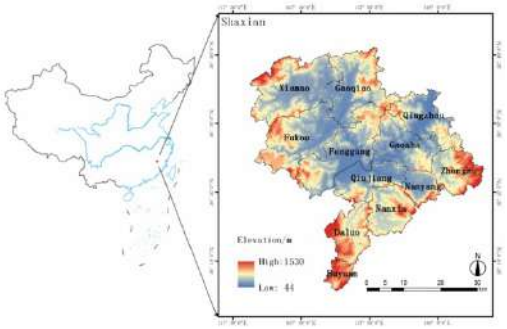
[Objectives]Regional landscape is the external representation of the human-land coupling system of national territory. Its sustainable development is essential for improving the human settlements and enhancing the human well-being. Focusing on the hotspot region of Southeast China, there are fruitful results of relevant research. However, established studies have paid insufficient attention to inland areas of southeastern China, and there are relatively few mesoscale county studies and quantitative studies. Therefore, there is an urgent need for relevant quantitative research in the interior of southeastern China by analyzing its landscape patterns and processes as well as ecosystem services.
[Methods]Shaxian County of Fujian, which is in the hilly inland area of southeastern China, was selected as the object. Based on satellite remote sensing land use data, open-source data of natural geography and social economy, statistical yearbooks and local records, the land use of Shaxian County was simulated and predicted under three development scenarios (natural development scenario, urban development scenario and ecological protection scenario) in 2030 by comprehensively applying the land transfer matrix, landscape pattern index, PLUS model, and ecosystem service value (ESV) assessment. The spatial and temporal evolution of the landscape spatial pattern as well as the ESV of Shaxian County was revealed since 1990. It is considered to provide strong support for the sustainable development of the inland human settlements of southeastern China, represented by Shaxian County.
[Results]The results showed that: 1) From 1990 to 2020, forest and cropland were antagonistic, impervious area increased significantly, and watershed were relatively stable. 2) From 1990 to 2020, landscape fragmentation, complexity, dispersion and heterogeneity increased, and connectivity and aggregation of dominant patches of the landscape decreased. From 1990 to 2020, the ESV declines at an accelerated rate, and the transformation of higher and highest value areas to medium and lower value areas is accelerated. 3) Among the three development scenarios in 2030, the ecological protection scenario has the lowest fragmentation of the overall landscape pattern, the highest total ESV, and the highest ESV of ecological land such as forest, grassland and watershed.
[Discussions/Conclusions]During the 30 years, economic and social changes dominated by events, population movement, and policies had a significant impact on the regional landscape. Compared with plain cities, hilly cities have tense construction land and more sensitive ecological environment. During the 30 years, forest was the main body of the landscape, and urban development was characterized by cohesion due to topographic constraints. The synergistic extrapolation of impervious area and cropland intensified the transfer out of low elevation forest. There is a lack of buffer zone between construction land and ecological land. Landscape fragmentation increases and ESV decreases under the 3 scenarios in 2030. The ecological protection scenario can maximize the preservation of the regional landscape

characteristics of Shaxian County. It is also the most consistent with the requirements for high-quality development such as "eco-livability" and "happy life".

Keywords: regional landscape, PLUS model, ecosystem services value, multi-scenario simulation, hilly mountainous areas

01_Shaxian County of Fujian, China



02_land transfer matrix, landscape pattern index, ecosystem service value, PLUS model

$$S_{ij} = \begin{bmatrix} S_{11} & S_{12} & \cdots & S_{1n} \\ S_{21} & S_{22} & \cdots & S_{2n} \\ \cdots & \cdots & \cdots & \cdots \\ S_{n1} & S_{n2} & \cdots & S_{nn} \end{bmatrix}$$

$$PD = \frac{N}{A}$$

$$LPI = \frac{\max(a1,\ldots,an)}{A} \times 100$$

$$ED = \frac{E}{A}$$

$$LSI = \frac{0.25E}{\sqrt{A}}$$

$$AI = \left[\sum_{i=1}^{m} \frac{g_{ij}}{\max - g_{ij}} Z_i\right] \times 100$$

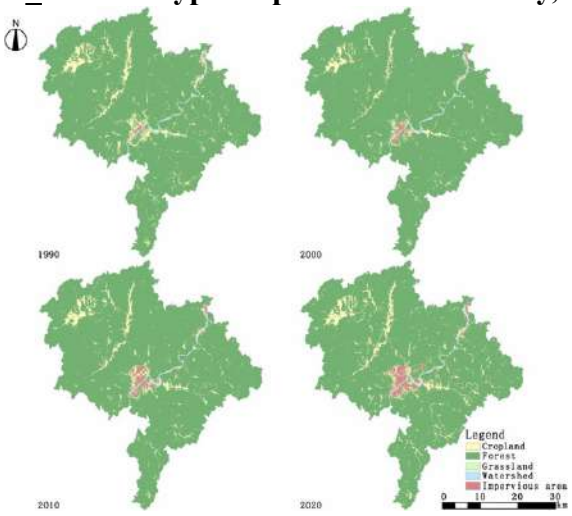
$$CONTAG = \left[1 + \frac{\sum_{i=1}^{m}\sum_{k=1}^{m}\left[(p_i) \times \left(g_{ik} / \sum_{k=1}^{m} g_{ik}\right)\right]\left[\ln(p_i) \times \left(g_{ik} / \left[\sum_{k=1}^{m} g_{ik}\right]\right)\right]}{2\ln(m)}\right] \times 100$$

$$SHDI = -\sum_{i=1}^{m} (p_i \ln p_i)$$

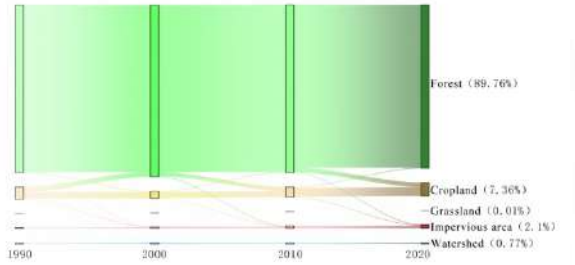
$$ESV = \sum_{i=1}^{n} A_i \times VC_i$$

$$X_i = \frac{\Delta TA_i - \Delta TA_{\min}}{\Delta TA_{\max} - \Delta TA_{\min}}$$

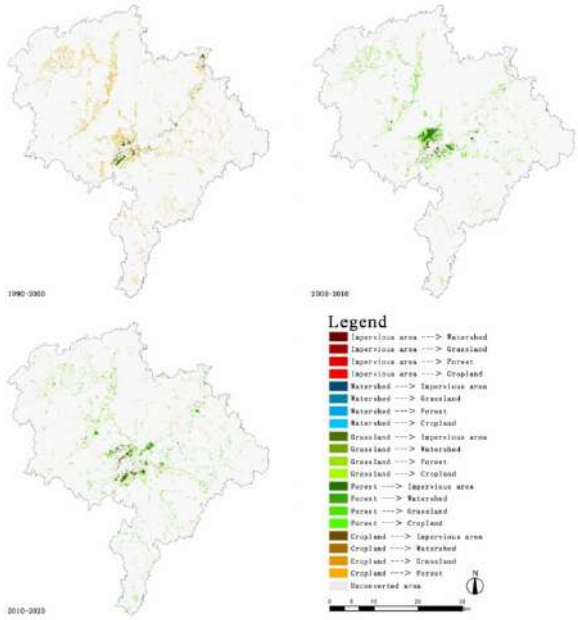
03_land use type map of Shaxian County, 1990-2020



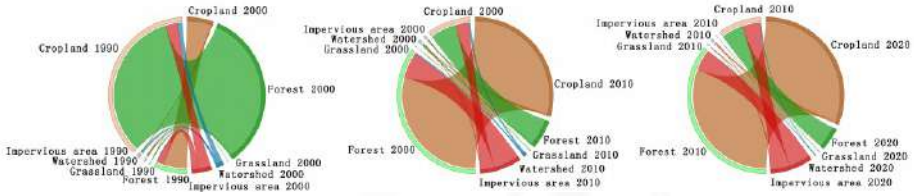
04_land use area transfer sankey map of Shaxian County, 1990-2020



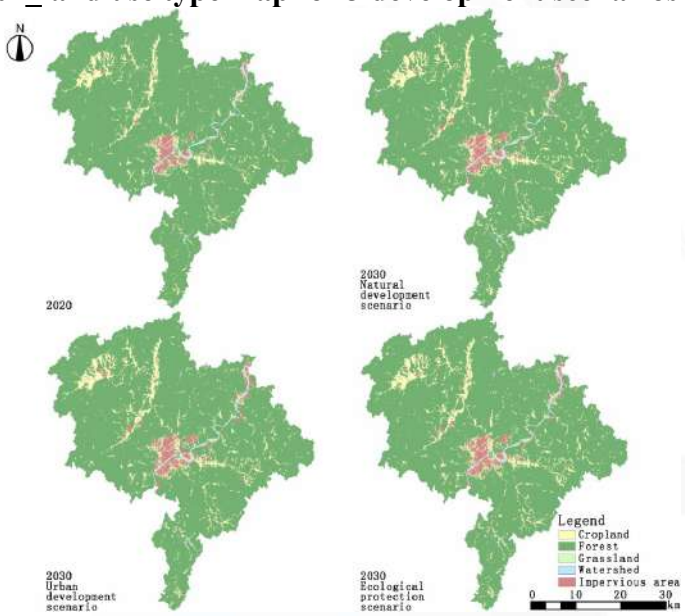
05_mapping land use changes in Shaxian County, 1990-2020



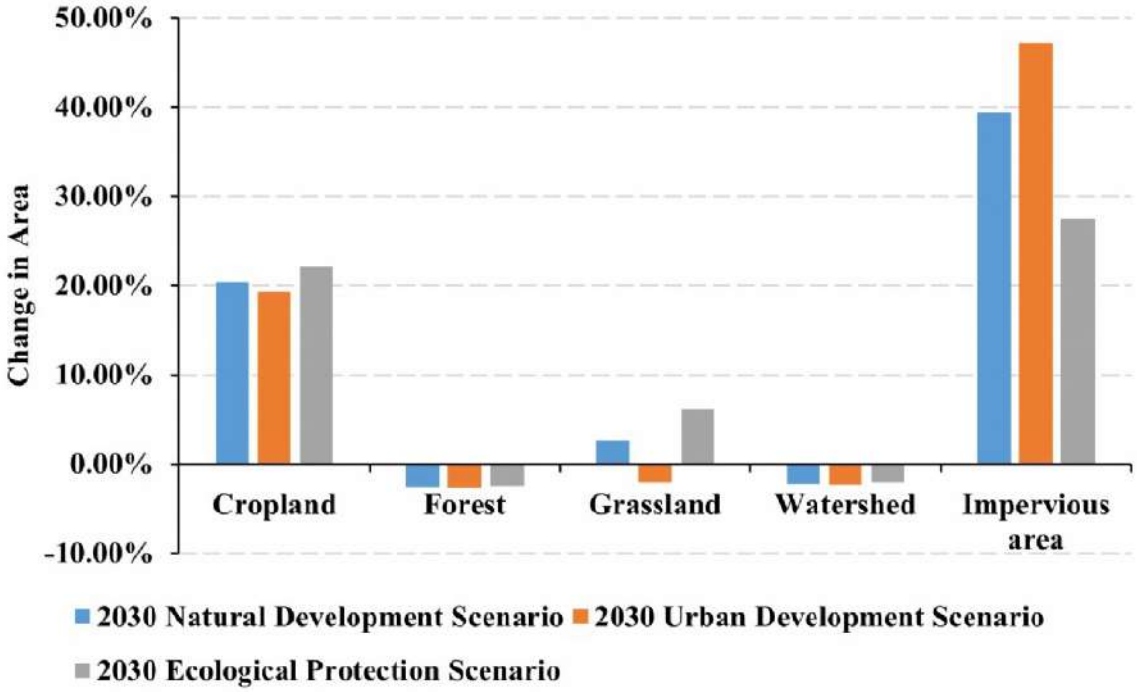
06_land use area transfers of Shaxian County, 1990-2020



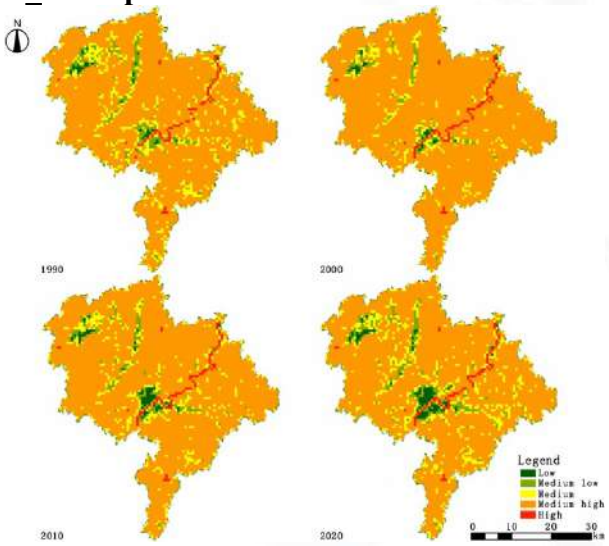
07_land use type map for 3 development scenarios of Shaxian County in 2030



08_changes in the area of each category in 2030 compared to 2020 under the three scenarios



09_ESV spatial distribution of Shaxian County, 1990-2020



10_spatial distribution of ESV in Shaxian County under 3 Scenarios in 2030

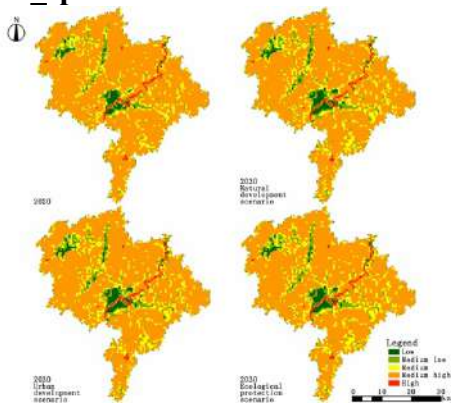


Table 1 ESV per unit area in Shaxian County (Unit: Yuan per hm^2)

First category	Second category	Cropland	Forest	Grassland	Watershed	Impervious area
Provisioning Services	Food production	1 392.61	269.65	307.19	819.18	0.00
	Raw material production	92.16	614.39	455.67	235.51	0.00
	Water supply	-2 693.05	317.43	250.87	8 488.75	0.00
Regulating Services	Air regulation	1 136.61	2 024.06	1 592.28	788.46	20.48
	Climate regulation	583.67	6 061.93	4 213.66	2 344.90	0.00
	Environment clarification	174.08	1 774.89	1 392.61	5 683.06	102.40
	Hydrological regulation	2 785.21	3 959.37	3 087.29	104 691.22	30.72
Supporting Services	Soil conservation	10.24	2 467.78	1 940.43	952.30	20.48
	Maintenance of nutrient cycling	194.56	187.73	148.48	71.68	0.00
	Biodiversity	215.03	2 245.92	1 766.36	2 611.14	20.48
Cultural Services	Aesthetic landscape	92.16	986.43	778.22	1 935.31	10.24

Table 2 Acreage and percentage of each land use category in Shaxian County, 1990-2020

Land use category	1990		2000		2010		2020	
	Area/hm^2	Percentage/%	Area/hm^2	Percentage/%	Area/hm^2	Percentage/%	Area/hm^2	Percentage/%
Cropland	11 867.31	6.597 7	7 424.91	4.127 9	9 984.51	5.550 9	13 244.58	7.363 4
Forest	165 950.91	92.261 4	169 691.85	94.341 2	165 976.83	92.275 8	161 452.26	89.760 3
Grassland	29.61	0.016 5	8.91	0.005 0	17.46	0.009 7	10.26	0.005 7
Watershed	1 218.69	0.677 5	1 407.78	0.782 7	1 428.12	0.794 0	1 388.79	0.772 1
Impervious area	803.88	0.446 9	1 336.95	0.743 3	2 463.48	1.369 6	3 774.51	2.098 5
Total	179 870.40	100.000 0	179 870.40	100.000 0	179 870.40	100.000 0	179 870.40	100.000 0

Table 3 land use transfer matrix of Shaxian County (unit: hm^2)

Period	Land use type	Cropland	Forest	Grassland	Watershed	Impervious area	Area of change
1990-2000	Cropland	6 426.98	4 881.07	1.34	157.84	399.31	5 439.56
	Forest	768.98	164 785.96	1.03	26.66	207.92	1 004.60
	Grassland	8.13	11.90	5.29	2.26	2.03	24.32
	Watershed	6.89	37.03	0.00	1 164.14	9.31	53.23
	Impervious area	26.31	7.19	0.01	57.98	712.38	91.50
2000-2010	Cropland	6 007.36	774.11	5.15	49.78	400.89	1 229.94

	Forest	3 914.52	164 995.23	8.38	35.85	769.17	4 727.92
	Grassland	3.06	0.97	3.11	0.00	0.54	4.57
	Watershed	25.86	41.32	0.60	1 330.95	10.15	77.94
	Impervious area	32.85	5.16	0.22	10.21	1 282.51	48.44
2010-2020	Cropland	8 652.51	701.91	4.86	18.18	607.05	1 332.00
	Forest	4 532.22	160 749.45	2.07	1.71	691.38	5 227.38
	Grassland	5.13	0.81	3.06	0.27	8.19	14.40
	Watershed	54.27	0.09	0.27	1 366.20	7.29	61.92
	Impervious area	0.45	0.00	0.00	2.43	2 460.60	2.88
1990-2020	Cropland	8 449.02	1 976.31	2.79	169.02	1 270.17	3 418.29
	Forest	4 750.47	159 443.00	4.95	8.91	1 743.30	6 507.63
	Grassland	10.53	10.26	2.25	1.53	5.04	27.36
	Watershed	30.15	22.23	0.27	1 152.09	13.95	66.60
	Impervious area	4.41	0.18	0.00	57.24	742.05	61.83

Table 4 Area and percentage of each land use type in Shaxian County in 2030 under 3 scenarios

Land use type	Status of land use in 2020		Natural development scenario in 2030		Urban development scenario in 2030		Ecological protection scenario in 2030	
	Area/hm^2	Percentage/%	Area/hm^2	Percentage/%	Area/hm^2	Percentage/%	Area/hm^2	Percentage/%

Cropland	13 244.58	7.363 4	15 942.78	8.863 5	15 789.73	8.778 4	16 171.85	8.990 8
Forest	161 452.26	89.760 3	157 299.03	87.451 3	157 156.17	87.371 9	157 513.55	87.570 6
Grassland	10.26	0.005 7	10.53	0.005 9	10.05	0.005 6	10.89	0.006 1
Watershed	1 388.79	0.772 1	1 358.28	0.755 1	1 356.73	0.754 3	1 360.42	0.756 3
Impervious area	3 774.51	2.098 5	5 259.78	2.924 2	5 557.73	3.089 9	4 813.69	2.676 2
Total	179 870.40	100.000 0	179 870.40	100.000 0	179 870.40	100.000 0	179 870.40	100.000 0

Table 5 Landscape pattern index of landscape Level in Shaxian County

Year	PD	ED	LSI	CONTAG	SHDI	AI
1990	4.486 0	22.196 0	26.382 2	86.239 6	0.313 1	96.558 1
2000	2.968 8	15.702 1	19.498 4	88.843 0	0.261 4	97.532 0
2010	2.731 4	17.007 1	20.881 7	86.272 3	0.332 7	97.340 1
2020	3.126 7	21.786 0	25.947 7	83.120 8	0.408 2	96.625 8
2030(ND)	3.004 4	28.659 1	33.233 6	79.925 6	0.226 5	95.596 3
2030(UD)	3.039 4	28.731 2	33.309 9	79.783 1	0.227 9	95.585 7
2030(EP)	2.977 7	28.371 3	32.928 4	80.180 5	0.224 3	95.639 3

Table 6 Landscape pattern index of type level in Shaxian County

Land use type	Index	1990	2000	2010	2020	Average 1990-2020	2030(ND)	2030(UD)	2030(EP)
Cropland	PD	3.374 7	2.194 9	1.674 0	2.050 9	2.323 6	1.687 9	1.700 1	1.660 1
	LPI	0.910 7	0.674 5	0.813 4	1.176 1	0.893 7	1.375 0	1.321 4	1.383 2

	ED	21.262 8	14.416 5	15.376 1	20.154 8	17.802 6	25.501 4	25.343 7	25.705 8
	LSI	87.749 7	75.205 2	69.185 9	78.748 7	77.722 4	90.880 0	90.745 8	90.957 5
	AI	76.019 3	74.049 9	79.440 4	79.659 4	77.292 3	78.588 0	78.515 0	78.722 9
Forest	PD	0.618 8	0.407 0	0.578 2	0.523 7	0.531 9	0.811 1	0.835 6	0.800 0
	LPI	54.392 4	56.035 0	54.489 5	53.063 1	54.495 0	51.811 8	51.787 1	51.939 5
	ED	20.156 3	13.864 5	14.196 9	17.789 0	16.501 7	24.451 3	24.512 0	24.154 7
	LSI	25.159 8	18.017 8	18.570 9	22.847 3	21.149 0	30.672 6	30.766 6	30.330 3
	AI	98.219 4	98.759 4	98.704 7	98.367 5	98.512 8	97.753 0	97.745 6	97.781 1
Watershed	PD	0.089 0	0.088 4	0.097 3	0.096 7	0.092 9	0.095 6	0.095 1	0.095 6
	LPI	0.566 9	0.642 2	0.678 0	0.654 4	0.635 4	0.654 5	0.654 7	0.654 5
	ED	1.226 4	1.219 5	1.251 1	1.240 2	1.234 3	1.271 2	1.277 9	1.256 9
	LSI	16.227 5	15.000 0	15.313 5	15.369 5	15.477 6	15.680 0	15.697 2	15.508 0
	AI	86.785 4	88.676 6	88.543 4	88.312 2	88.079 4	88.128 4	88.111 1	88.219 4
Impervious area	PD	0.295 8	0.244 1	0.333 0	0.416 4	0.322 3	0.373 6	0.369 7	0.384 7
	LPI	0.125 0	0.202 4	0.535 4	0.769 7	0.408 1	0.801 7	0.836 5	0.789 5
	ED	1.567 1	1.848 5	3.092 6	4.327 4	2.708 9	6.037 8	6.268 8	5.567 2
	LSI	24.747 4	22.725 4	28.042 3	31.687 8	26.800 7	37.670 1	38.076 8	36.299 3

	AI	74.47 1 0	82.00 9 8	83.54 9 9	84.92 6 0	81.239 2	84.689 3	84.941 6	84.608 5

Table 7 Changes in ESV in Shaxian County (unit: ten thousand yuan)

Land use type	ESV						
	1990	2000	2010	2020	2030(ND)	2030(UD)	2030(EP)
Cropland	4 727.10	2 957.54	3 977.09	5 275.66	6 350.43	6 289.47	6 441.67
Forest	346 996.30	354 818.40	347 050.46	337 589.77	328 905.55	328 606.82	329 354.09
Grassland	47.20	14.20	27.82	16.35	16.78	16.01	17.36
Watershed	15 675.00	18 107.08	18 368.70	17 862.83	17 470.40	17 450.47	17 497.96
Impervious area	16.50	27.38	50.45	77.30	107.72	113.82	98.58
Total	367 462.10	375 924.60	369 474.51	360 821.91	352 850.87	352 476.58	353 409.66

Urban green space form influencing spatial patterns of noise complaints

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The impact of urban noise on residents' physical health and mental status has gradually become a hot topic of public discussion. One of issues with healthy city focus on urban green space form influencing spatial patterns of noise complaints. We conducted a case study in Fuzhou, China, including identifying green space morphology indicators, collecting public noise complaint data, and conducting sound pressure level measurements. The spatial distribution characteristics of urban neighborhood noise complaints and on-site sound pressure levels were analyzed by kernel density analysis and inverse distance weighted interpolation,respectively. Results show that: 1) There is a strong positive correlation with noise complaint data and objective acoustic indicators, including Number of patches (NP), Patch Density (PD), Landscape shape index (LSI), Landscape Division Index (DIVISION), and Splitting Index (SPLIT). 2) There is a strong negative correlation with noise complaint data and objective acoustic indicators, including Class Area (CA), Largest Patch Index (LPI), Proportion of Like Adjacency (PLADJ), Patch Cohesion Index (COHESION),Effective Mesh Size (MESH) and Aggregation index (AI). Our findings suggest that these indicators contribute a basis for the development of landscape planning and control strategies, and an understanding for exploring distribution of quiet spaces.

Keywords: noise complaints,quiet spaces,urban green space,sustainable city

Spontaneous Plant Library and Potential Application in Urban Landscape

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Proliferated in urban derelict, vacant land and marginal space, the apparently homogenous and disorder form of spontaneous plants, conventionally categorized with the term 'weed', is often associated with a negative impression and reckoned to be undesirable and nuisance in the urban environment. Yet, the ecosystem services and resilience of these spontaneous inhabitants, which thrive in the most human-disturbed conditions, are often overlooked and rendered invisible.

This ongoing project aims to re-examine the human-plant symbiosis relationship by investigating the aesthetics, functions and benefits of these unintended plants and scrutinizing our perception of 'weed' from an ethnobotanical perspective. There are two major objectives in this project, namely to build up a comprehensive library on spontaneous plants in Hong Kong and conduct trials for the potential application of these plants species also commonly found in major cities in South China. The initial findings have revealed that unlike conventional understanding, many of the 'weed' species considered as invasive and listed for eradication in routine maintenance operations are in fact native species with ecological value and often form part of the rural life and vernacular knowledge. The experimental planting featured in the 2022 Hong Kong Shenzhen Bi-City Biennale of Urbanism \ Architecture, which explored the planting palette composed of 'weed' species in Poaceae family, has also caused a shift in the discourse of landscape aesthetics.

By advocating the introduction of urban wilderness, incorporation of spontaneous plants in landscape design and adaptive horticultural maintenance, this project contends that spontaneous landscape is not only part of the total experience in urban nature intertwined with cultural, economic and social nexus but also crucial to the exploration of co-existence with multispecies in a hyper-dense urban environment and a more sustainable future.

Keywords: Spontaneous plants, unintentional landscape, ruderal ecology, urban nature

Coastal Erosion Mitigation: Relationship between Seaweed and the Coast

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In Europe, 20,000 kilometers of coastline faced erosion in 2004, with 28% currently affected (Salman et al., 2004). Rapid erosion necessitates an annual average of 5,400 million euros until 2020 for mitigation efforts. Coastal erosion in Europe warrants a "code red" alert. Revitalizing coastal vegetation is crucial (McIvor, A.L., 2012). Seaweeds offer effective shoreline stabilization and wave energy absorption (Silliman, 2013), while cultivating them in erosion-prone areas can alter recovery (Airoldi, 2007). This study aims to elucidate the relationship between coastal landscapes and seaweed to detect erosion changes in areas with and without seaweed habitat. The study is limited to evaluating the influence of seaweed on coastal erosion and its prospective contribution to safeguarding coastal environments. The methodological framework delineated for this research presents a thorough and systematic approach to investigating the intricate interplay among coastal landscapes, seaweed habitats, and erosion dynamics. Commencing with comprehensive data acquisition and meticulous image processing, the study is centered on the precise identification of seaweed habitats and the rigorous evaluation of erosion rates within targeted coastal regions of Turkiye. Leveraging computational methodologies, including Species Distribution Modeling (SDM) algorithms, spectral signatures, and spatial modeling techniques, the research endeavors to precisely quantify the distribution of seaweed populations and develop predictive models about coastal erosion parameters such as shoreline recession and sediment depletion. With a particular emphasis on regions characterized by pronounced coastal erosion in Turkiye, comparative analyses are conducted vis-à-vis regions exhibiting comparatively lower erosion levels, thereby facilitating a nuanced understanding of the potential mitigative effects of seaweed presence on erosive processes. Employing predictive correlation techniques within the SDM framework facilitates estimating relationships, rather than causality, between various variables, enriching our comprehension of the intricate dynamics at play. Rigorous statistical analyses, including logistic regression and bivariate correlation, are employed to empirically validate predictions and ascertain the robustness of the relationship between seaweed presence and erosion rates. The findings of this study hold significant scholarly and practical implications, informing the development of innovative seaweed-based interventions within coastal management frameworks aimed at fortifying the resilience of vulnerable coastal ecosystems against erosive forces.

Keywords: coastal erosion, coastal vegetation, seaweed resilience, SDM algorithms

Survival of Heritage Gardens Along the Silk Road

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Heritage Gardens are ancient realms with unique histories and values that have lived for generations. However, these realms are under constant threat by various factors posing significant challenges to their management and conservation.
[Objectives] The research aims to analyze the impact of climate change on selected heritage gardens along the Silk Road and evaluate the current adaptation strategies implemented, vital to their survival and resilience. The study analyzed how these selected gardens are being impacted by climate change, particularly in terms of their ecological, aesthetic, and cultural values.
[Methods] The research adopts a mixed-method approach, using selected case studies from a series of heritage gardens along the Silk Road, categorized based on geographical location, size, and historical significance. The research underwent an extensive review of historic texts, analyzing climate reports and documentation from recent related studies. Data were gathered through onsite observations and organized sessions with conservation experts and local communities. This data was then further analyzed to delineate the current adaptation and resilience strategies being implemented.
[Results] The research revealed that heritage gardens along the Silk Road are experiencing varying degrees of impact from climate change. These impacts include alterations in precipitation patterns, increased temperatures, and more frequent extreme weather events, which tend to pose significant threats to biodiversity, existing resources, and the overall coexistence of the gardens.
The outcome provides insights into best practices and recommendations for other heritage gardens facing similar challenges. The research evaluates the effectiveness and overall alignment with the principles of Sustainable Development Goals (SDGs) towards fostering a greater appreciation of transcending the enduring garden heritage traditions to prevail in their legacies across time.

Keywords: Survival; Heritage Gardens; Silk Road

Multi-scale driving mechanism and optimization of cultivated land "non-grain"

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"BACKGROUND: China has a population of 1.4 billion. As the world's largest grain producer and the world's third largest grain exporter, food security is of extreme importance. Cultivated land is the carrier of agricultural resources such as food production, and protecting cultivated land resources is the basis of ensuring food security. However, with the rapid growth of China's economy and acceleration of urbanization at the end of the 20th century, the economic and social development has intensified the squeeze on agricultural land resources. Excessive cultivated land ""non-grain"" policy, resulting in the implementation of the ""balance in and out"" of cultivated land in place, illegal construction occupied farmland is still showing a trend of reduction under the high-pressure situation of resolute investigation. In response to the serious problem of ""non-grain"" cultivated land, The State Council has put forward a new policy of ""balance in and out"", which directly refers to the problem of ""non-grain"". How to curb the ""non-grain cultivation"" of cultivated land has become a major strategic issue related to the development of our national economy, social stability and national security.

OBJECTIVE: The policy of ""balance in and out"" is to prevent the deterioration of ""non-grain"" of cultivated land, so the analysis of the logical mechanism and driving mechanism of the phenomenon of ""non-grain"" of cultivated land is an important prerequisite for its accurate control. At present, there is still a lack of complete and scientific farmland non-grain driving mechanism system in the academic field, and revealing its complete driving mechanism is important to the scientific optimization of policy. Scale is an important issue in land research. The ""non-grain"" problem of cultivated land also reflects different driving characteristics at different regional scales, but there is almost no research on the difference of driving mechanism of cultivated land ""non-grain"" at different scales. Therefore, this paper studies the non-grain driving mechanism from three scales and explores its differences, so as to scientifically optimize and verify the multi-scale implementation of cultivated land ""balance in and out"".

METHODS: Starting from the problem of ""non-grain"" of cultivated land, the multi-scale driving mechanism of ""non-grain"" was explored from the principal level. First, clarify the spatial-temporal pattern evolution law of cultivated land ""non-grain"". Secondly, explore the multi-scale driving mechanism of the spatial evolution of ""non-grain"" at the provincial-city-county level, clarify the multi-scale collaborative driving mechanism and select highly sensitive driving factors. Finally, based on the multi-scale highly sensitive driving factors, the future land demand is predicted, and the hierarchical optimization suggestions are put forward in combination with the spatio-temporal evolution law, etc. At the same time, the multi-scenario and multi-scale future pattern simulation is carried out to verify the effectiveness of differentiated policy implementation approaches.

CONCLUSION: The spatial pattern and migration path of cultivated land in Guangdong Province were analyzed by using scientific and reasonable model methods, and the spatial

distribution characteristics of cultivated land in Guangdong Province were revealed, which provided references for territorial space optimization measures and further enriched the research content of cultivated land"

Keywords: non-grain cultivation of cultivated land, red line of cultivated land, food security, ecosystem services

Examining dynamic urban open spaces: the case of Museum Gazhane

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Today, people, most of whom live in urban areas and have diverse socio-cultural backgrounds, need places in cities where they can gather, express themselves, socialize and interact. In this context, urban open spaces hold significant importance. Particularly in areas of high urban density, the quality of urban open spaces that meet user needs has a direct impact on important issues such as the quality of life, sustainability and well-being in cities. Therefore, the design of urban open spaces requires a multi-faceted approach that goes beyond mere physical design, taking into account the socio-cultural and historical values of the city and its users. In this context, the concept of placemaking, which represents a comprehensive approach, focuses on community involvement in the design of public open spaces, integrating all the values that constitute the community (urban memory, identity and local culture) alongside functionality and spatial aesthetics. Adaptive reuse and industrial heritage preservation are integral components of placemaking, as they breathe new life into historic industrial spaces, revitalizing communities and fostering a sense of belonging by honoring the cultural and architectural legacy of a place. Through thoughtful restoration and repurposing, these initiatives transform once-abandoned sites into vibrant hubs that celebrate the unique character and identity of their surroundings.

Museum Gazhane, which appears as an industrial heritage, has been transformed into a cultural and urban open space in Istanbul within the scope of the adaptive reuse project. In this context, a behavior-based assessment was conducted to examine how the complex relationship between the historical and cultural value, social diversity, and community engagement of the Museum Gazhane effects on the vitality, diversity, and uses of open spaces. In the case study analysis, the data about open spaces and users were obtained using observation, interviews, and behavioral mapping methodological approaches. Through interviews and observations within the scope of the study, the user diversity of the area, consisting of local users, students, daily visitors, and employees, was determined. The study highlights how the historical texture and identity of the area positively influenced the users and shaped their usage patterns within it. Museum Gazhane has been evaluated as a versatile and friendly space that addresses the different needs of the users who are playing, working, and traveling in a complex way. Furthermore, the study shows that the area not only reveals diversity with the users it brings together from various parts of the city, but also serves as a significant meeting point that meets the city's various open space needs. When the role of the transformation of the Museum Gazhane over time is examined, this study emphasizes that repurposed areas have an importance that should be taken into account in the design of qualified urban open spaces and that they should be taken into consideration in creating livable cities with the diversity, liveliness and different uses they offer.

Keywords: Place-making, industrial heritage, adaptive reuse, local participation, place identity

Nature Based Solutions in the public schools to climate mitigation

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Sangalli Coronel y Asociados S.L

In 2022 the "Fundación de Patrimonio Natural de Castilla y León", launched a competition to renaturalize school playgrounds. Our studio, with a team of four landscape designers, was selected to work in thirteen schools in the provinces of Burgos and Soria, in the Castilian plateau, having finished the execution this year.
Our public schoolyards in Spain,are usually all in concrete paving, without a single tree or plant in it.
The general objectives of this project are to increase adaptation and resilience to climate change through the application of nature-based solutions in public schools in through the implementation of the following general actions:
- the reduction of the outdoor heat island effect Increased shade, reduction of solar radiation, natural temperature regulation, and heat absorption of materials.
- improving and/or increasing soil permeability, Treatment of built surfaces (pavements) replacing them with permeable pavements or green areas.
-Irrigation water management and increased drainage capacity by improving surface runoff.-
- Enhancement of vegetation and other local biodiversity with special attention to local agro-food varieties, promotion of pollinators and insectivorous birds.
In this way, this ambitious project aimed to address the main consequences of climate change which has a particular impact on one of the most vulnerable sectors of the population – children, to educate and raise awareness through the new playgrounds.
The budget for each school has been limited but even so the objectives have been met with a dose of imagination and creativity. Using the landscape as inspiration and in close cooperation with the school's professor, pupils, and parents, we have designed and constructed new schoolyards where be in contact and enjoy nature. The best tool in this period of climate emergency and incertitude may be this, to raise awareness and educate from these new nature classrooms. Because to know is to love. and to care
The aim of the presentation is a reflection on the methodology applied, the elements to improve, and the results of this process.
This project has been funded as part of the EU response to the COVID-19 pandemic and its social consequences and to prepare for a green, digital and resilient recovery of the economy (REACT-EU).

Keywords: Schoolyard naturalisation, Nature Based Solution, Nature education, Climate adaptation

Schooyard Principe de España, Miranda de Ebro Spain

renaturalisation of the schoolyard Example in Miradna de Ebro Spain.One of the examples

Some of the activities realised in the school with the children

Spatial Narratives in Urban Landscape and Identity

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Narrative and storytelling have become key elements of landscape design. This presentation focuses on this trend in the United States by examining four major memorials: the January 8 Memorial in Tucson, 9/11 in New York City, the Boston Freedom Trail, and the Comfort Women Memorial in San Francisco. Narrative designs in European and American cities have noticeably increased after recent tragedies and in the context of increasing affluence among certain nations and demographic groups. These narratives vary by the stories they tell and by when and where they were created, but together engage issues of collective memory and heritage as well as a sense of place and community.
Our focus is how narratives are structured at each site in the three-dimensional spaces of landscapes and how the community understands and uses them. In this context, the positioning of the sites, landscape elements arrangement, layout, orientation, sequence, and other characteristics of the staging of text and narrative to the landscape presented within were examined separately. We do this with photographs, project plans, short videos, literature, survey questionnaires, mapped and explained using the deep mapping method in a GIS environment. The goal of the research is to create a common language to understand how narrative landscapes and the landscape elements established in these sites are understood and used, and with what motivations visitors and communities visit them. This approach holds the potential to improve the design practice of narrative landscapes, collective memory, and place identity by interpreting how narrative landscapes are configured in the urban landscape and how they are perceived by the community. The results of the study will be discussed and elaborated separately.

Keywords: Narrative landscapes, Storytelling, Spatial Narratives, Deep Mapping.

Second development opportunities for traditional settlements featuring Yaodong, in China

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Vernacular settlements, as cultural landscape heritages, hold significance in their reflection of the history, culture, and daily life of local people through traditional architecture and spatial structures. However, these settlements, deeply rooted in traditional civilizations and lifestyles, are now often perceived as symbols of poverty, backwardness, and underdevelopment due to their inability to meet modern daily life demands, ideals, and contemporary concepts. Moreover, exacerbated by the hollowing-out trend caused by rapid urbanization, the urgency of protecting traditional settlements is evident. Located in the loess plateau of the inland regions of China's central and western areas, rural settlements with Yaodong (a type of cave-dwelling) face even more profound crises due to geographical, industrial, and climatic factors. However, research on rural architecture often focuses on renovating individual buildings, while studies on revitalizing traditional settlements prioritize tourism as the goal.

This study aims to achieve the sustainable endogenous development of vernacular settlements characterized by Yaodong in China through the adaptive transformation of buildings and open spaces, implementing smart shrinkage and organic growth interventions for settlement. Based on the understanding of the future development process of the unique vernacular settlements through exploratory scenarios, essential areas for endogenous development within the settlements have been identified, including the area with the highest permanent population and areas experiencing the most population loss due to terrain elevation. Based on the analysis of the daily needs of current and potential residents, the characteristics of traditional buildings (Yaodong and other traditional buildings), and the settlement spatial context, typologically differentiable strategies for reuse planning of traditional buildings and open spaces within key areas have been developed, with the applicability demonstrated throughout the entire study village.

Derived from the village context and applied according to the situation, these strategies constitute a set of instruments that can facilitate the successful endogenous development of rural settlements. The scientific validity of the instruments can be verified in the future by studying more similar regions through the approach, Research through Design.

Keywords: Vernacular settlement, cultural landscape heritage, sustainable endogenous development, adaptive transformation, exploratory scenarios

Nature Based Solutions For Climate Change Mitigation In Metropolitan Copenhagen

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Like other metropolises, Copenhagen faces severe problems with climate change. Located at the sea in a low-lying landscape, the major climate change effects affecting the city is the general rising sea level combined with strong flood events from the ocean. Also rising groundwater, more intense rainfall events and heatwaves will hit the city at an increasing frequency. During the past couple of decades, record-breaking storm events have hit the city. This study evaluate the mitigation efforts during the last decades, and discuss future scenarios. Until now, the prevailing solution to the climate change challenges have been oriented towards hard solutions. Storm water management has largely been solved with extension of sewers and establishment of pumping capacities. The protection against floods from the ocean is done by concrete walls and by the establishment of artificial islands.
It is clear, however, that nature based solutions will be more needed in the future. There is too much coastline to protect completely by walls, and larger sewers are expensive and insufficient.
The design of the nature based solutions is one of the most prominent tasks of the 21st century. Inspiration to nature based solutions may draw experience from the past decades of smaller and larger projects. Nature based solutions have been introduced in coastal protection, and in storm water management. In 1980 a large coastal protection project was established, including a beach park laid out on barrier islands off the coast. This model was copied in 2007 to protect the east coast of the island Amager.
During the 2010s several municipalities have implemented urban designs to handle rainwater locally. This has been done with the establishment with smaller urban parks and small green infrastructures along streets, and relieve the conventional sewage system from storm water. Controversial hard solutions are still being planned, and there is a manifest need to combine hard solutions where they are needed with nature based solutions whenever possible.

Keywords: Climate mitigation, nature based solutions, Copenhagen

Identification and Optimization of World Heritage Irrigation Structures Multifunctional Corridors

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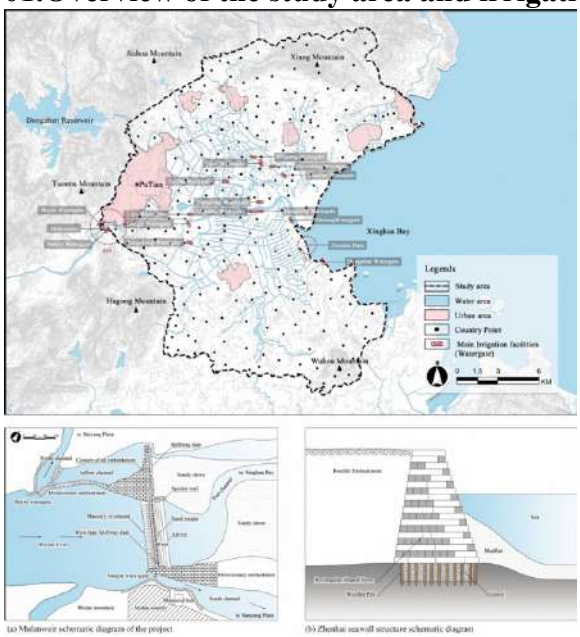
World Heritage Irrigation Structures (WHIS) is the witness of human agricultural civilization, the foundation of wide-area human ecosystems, and is crucial for food security, ecological conservation and cultural renaissance in developing countries. However, the existing problems of insufficient recognition of regional heritage value and lack of conservation methods have led to a surge in the risk of its sustainable development. It is of great significance to clarify the spatial and temporal differentiation of WHIS landscape functions, and to formulate scientific and reasonable ecological, production and cultural security strategies to rescue regional cultural clues and alleviate regional ecological crises. Mulanweir in Putian, China, was built in 1064, with an effective irrigated area of 91.33 km² and a beneficiary population of more than 500,000 people. The study explores the spatial aggregation characteristics and interaction relationship of representative landscape functions by integrating the Integrated Valuation of Ecosystem Services and Trade-offs (InVEST), kernel density analysis and Self-organizing map (SOM), and constructs multifunctional corridors through the Minimum cumulative resistance (MCR), based on which the spatial use of multi-purpose zones and potential conflict zones in the irrigation area are identified. The results show that: (1) the level of landscape functions in the irrigated area declined as a whole, and the ecological function and production function declined the most. The loss of ecological function of forest land and the decline of yield level of high-quality arable land need to be emphasized. (2) The social and cultural functions of the landscape have risen significantly, which may be due to the intensive development of construction land and the systematization of the spatial distribution of leisure and recreation functions. (3) The synergistic landscape function combination is easy to form the spatial distribution advantage, and the woodland and heritage elements are the important background for the formation of multi-functional landscape. The spatial utilization conflict area formed by the trade-off type landscape function combination has the characteristic of fragmentation. The water area and the peripheral suburban area of construction land are the key areas of spatial conflict. In addition, it is proposed to explore Multifunctional Networks-Oriented Development to form a multifunctional and mutually supportive landscape pattern.

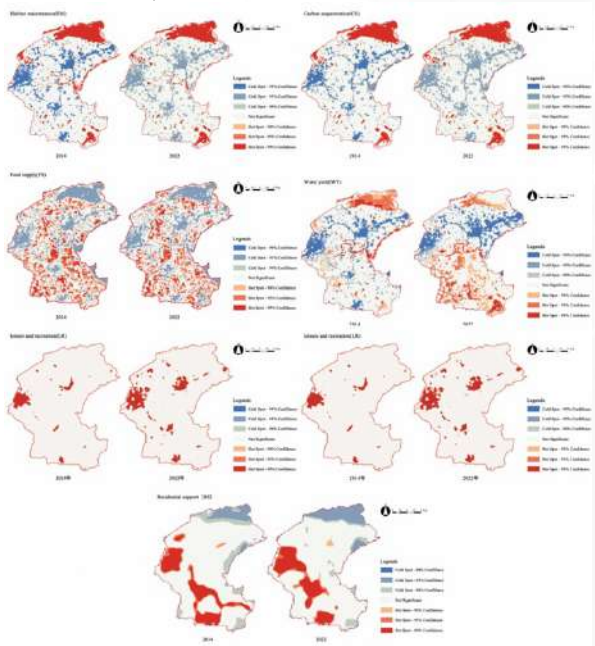
Keywords: heritage conservation,multifunctional landscapes,interactions,spatial and temporal evolutionary characteristics,control measures

01.Overview of the study area and irrigation engineering system

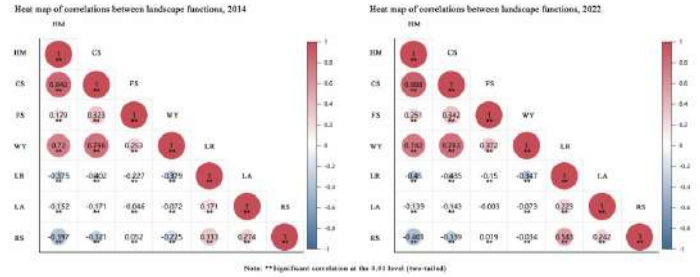


(a) Mulanweir schematic diagram of the project (b) Zhenhai seawall structure schematic diagram

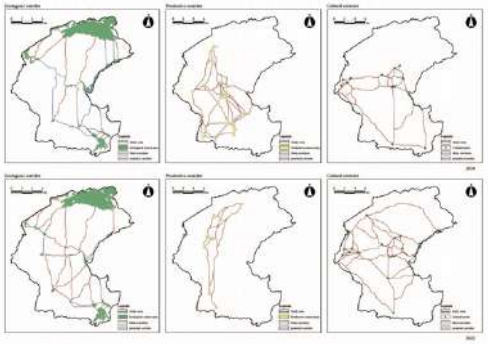
02.Characterization of the spatial evolution of landscape functional cold hotspots in the Mulanweir, 2014-2022



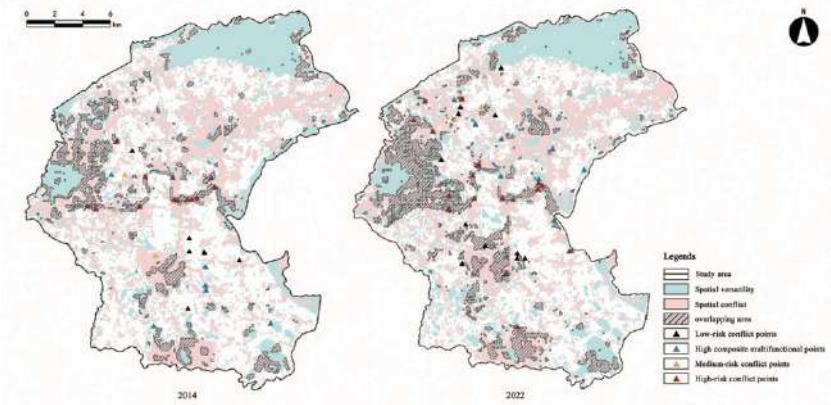
03.Trade-offs and synergies between the lanndscape functions of the Mulanweir, 2014-2022



04.Ecological, productive and cultural corridor construction



05.Scope and Characteristics of Landscape Functional Space Utilization Multi-Appropriateness Zones and Conflict Zones



Comparative research on Mining and Biodiversity Conservation in National Parks

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(Background)China is establishing a protected area system which is taking national parks as the most valuable and precious natural heritages. Protection and development are the core issues in the management process of protected area. Many studies have shown that biodiversity conservation in protected areas is seriously threatened by mining. According to one analysis that mining currently affects 35% of the Earth's land surface excluding Antarctica, of that, 7 percent of mining areas border or overlap with Key Biodiversity Areas.
(Objectives) This study aims to summarize the mining rights management approaches in National Parks in different countries from various dimensions including laws, finance, technology, regeneration strategies, and multiple subjects' cooperation, focusing on the United States, Canada, Australia, the European Union, Brazil, and Russia, providing guidance for the establishment of national park system in China.
(Methods) The research methods include comprehensive literature review, in-depth case studies and comparison of laws, guidelines, management regulations of mining rights in different countries. The selection of typical cases is based on literature research, official websites, news, and other means, offering multi-modes for the reuse of abandoned mines coupling with biodiversity conservation.
(Results)Through comparative analysis, it can be concluded that foreign countries have gradually established management system to balance the relationship between mining and biodiversity conservation in national parks. The United States and Canada no longer allow new mining rights to be applied within the boundary of national parks, Russia and Brazil strictly prohibit mining within protected areas. The EU constructed regional network of collaborative system (natura 2000) to alleviate the conflicts. Australia is relatively loose in managing mining rights through flexible measures such as adjusting the boundaries of protected areas. Western countries have already established a relatively complete legal system, exploring multiple financing channels for biodiversity compensation, and providing diversified regeneration strategies for abandoned mines coupled with biodiversity conservation.
(Discussions/conclusions) Based on the international comparative research, the article proposes 6 suggestions for mining management and biodiversity conservation in Chinese national parks as follows: (1) Establishing a complete legal system, and reserving channels for national strategic energy; (2) Establishing national special funds, and exploring financing channels to improve the biodiversity compensation system through economic policies such as banks, funds, and insurance; (3) Making a priority list for the reuse of abandoned mines based on site investigation and data analysis, constructing multi-scenario regeneration models for abandoned mines based on biodiversity conservation goals, and taking environmental, social, and economic benefits into consideration comprehensively; (4) Promoting communication and cooperation among government, mineral enterprises, scientific research institutions, and the public in order to provide professional consultation for mineral resource development and

biodiversity conservation; (5) Strengthening international cooperation to promote cross-region and cross-border mining management and biodiversity conservation in national parks, and establishing regional network protection mechanism; (6) Carrying out long-term monitoring of biodiversity, water, soil, air within the national parks and the buffer areas.

Keywords: National Parks, Mining, Biodiversity Conservation, Comparative Research, International Cooperation

Optimizing Plant Selection for Battling Heat Islands and Electromagnetic Pollution

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Urban Heat Island Effect is a growing issue for densely populated areas that affects millions of people. Scientific management of the disadvantages of this issue is still not a standard application in many major cities. Although this problem needs addressing in many parts of the world, the increase in the use of electric vehicles has introduced another type of pollution that particularly affects people living in urban areas. Electromagnetic pollution and Urban Heat Island Effects have adverse impacts on the surrounding environment in certain parts of the city. One of these spots is car parking areas with no precautions to protect the environment. The increase in the number of electric vehicles has resulted in the increase of charging stations in parking areas, worsening electromagnetic pollution. However, proper planting of these areas may provide a decrease in temperature levels and other negative impacts from electromagnetic pollution. In this study, a Multi-Criteria Decision-Making (MCDM) approach is used to investigate optimal plant species selection for car parking areas for electric and conventional vehicles in search of sustainable & resilient communities. MEREC and EDAS methods are used to conduct a versatile MDCM analysis that also focuses on criteria weights. Data from Rize-Türkiye are used to exemplify the suggested method which provides the most suitable plant species from a set of numerous plants that have been selected to match the environmental and geographical characteristics of the study area. Preliminary results show that certain plants offer optimal battling opportunities against Urban Heat Island Effect and Electromagnetic Pollution while matching the needs of the area being studied both environmentally and financially. This study aims to contribute to the sustainable planning of car parking areas within their transformation in parallel to the transition from classical combustion-engine powered vehicle-based transformation systems to electric-powered systems. Electrical cars and charging stations are still a minor choice in many countries compared to the usage of conventional cars, however, the growing interest in the use of electric vehicles may cause urgency to address this issue in the future. Our study aims to address the existing problem of Urban Heat Island Effect in addition to growing Electromagnetic Pollution for a detailed analysis.

Keywords: Multi-Criteria Decision-Making, Urban Heat Island Effect, Electromagnetic Pollution, Plant Selection, Sustainable Development.

Landscape character and capacity assessment in the Pearl River Delta

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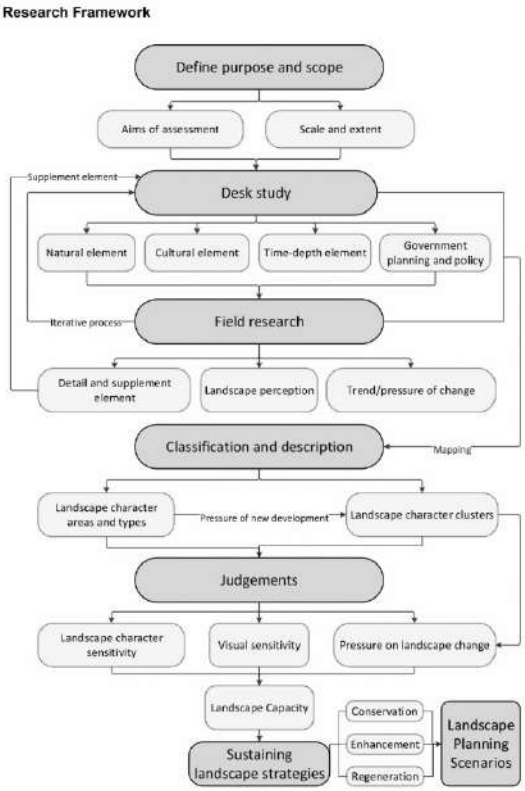
Ecological degradations and nature-environmental crises have been aware and valued in land development and urban-rural planning since the anthropogenic impacts such as climate change and biodiversity decline are widely studied and discussed in recent decades. However, as the second nature and the most representative landscape of human-nature interaction, cultural landscapes especially those haven't been designated as world/national cultural heritage or law-protected farmland suffered the major impacts of landscape change from both urban sprawl and ecological conservation in China nowadays. In 2003, the Countryside Agency of England suggested that English rural landscapes would be inevitably changed in two decades, whilst 91% of English people wanted to keep the rural landscape exactly as it was. In this circumstance, Landscape Character Assessment (LCA), a systematic approach focusing on all elements (including natural, cultural, aesthetic and historic dimensions) of landscape that makes one landscape distinctive from another rather than comparation of better or worse, is being widely employed within the UK in maintaining the diverse character and qualities of the tranquil rural landscape, while in the meantime allowing essential development to take place within sustaining form. However, LCA is seldom adopted in dynamic landscape change areas with rapid urbanisation, such as the Pearl River Delta of China. There are five steps in this research, namely, define purpose and scope, desk study, field research, classification and description, and judgements. It was defined that this research aimed at providing a guideline for future land development to maintain cultural landscapes especially their vernacular culture and key character against homogenous patterns of rapid urbanisation at a municipal scale within the first step. The desk study drafted the land description units by collecting and mapping with time-depth secondary data embracing geospatial data and maps of natural and social-economic factors (e.g. geomorphology, soil, land use, hydrology, settlement, government planning and policy, historic satellite images and topographic maps). Field research was conducted at 47 locations, which were selected samples of key element, traditional settlement, area with uncertain land use and with high pressure of landscape change based on draft land descriptions of desk study, with drone photography and records on detail and supplement element for desk study (e.g. vegetation, settlement and infrastructure), landscape perception (e.g. key landscape feature, aesthetics and intangible culture) and trend/pressure of change. All data collected in desk study and field research was integrated by mapping with CAD and GIS, which classified case study area into and 123 landscape character areas and 16 landscape character types (LCTs). Besides, 9 landscape clusters were integrated by correlative and adjacent landscape character areas with consideration on similar historic/cultural context and potential pressure of development. As for judgements, landscape capacity of each LCT in its landscape cluster was judged with integration of landscape character sensitivity, visual sensitivity and pressure. The assessment results which provided sustaining landscape solutions of corresponding landscape strategies by conserving, enhancing and regenerating landscapes will establish action-oriented

scenarios, especially for those landscape clusters with low capacity, to maintain key characters of their unique culture and landscape for future development.

Keywords: Landscape character assessment, cultural landscape, rapid urbanisation, landscape change, landscape capacity

Research Framework



Overall flowchart of methodology and research framwork for this research.

Impact of New Urbanization on Landscape Patterns' Spatial Characteristic

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The rapid expansion and accelerating pace of urbanization on a large scale profoundly reshape regional and global landscape patterns. Within this context, the spatial characteristics of the landscape pattern serve as crucial evidence reflecting the actual impact of urbanization on the ecological environment. China's urban areas are undergoing varying degrees of drastic changes in population, economy, and land use patterns. Nevertheless, the lack of interaction between urban planning practice and landscape ecology science directly leads to numerous challenges faced by this unprecedented urbanization process. In order to provide a new perspective on the spatial changes in landscape patterns due to urbanization, this study selects relevant data and redefines the framework and indicator system of new urbanization in Zhangjiakou City, China, from dimensions such as people's livelihoods, agricultural production, residential development, and cultural or social environment. Landscape metrics such as landscape fragmentation, landscape connectivity, and landscape complexity are utilized to describe the landscape pattern characteristics of Zhangjiakou City in China, while Geographically Weighted Regression (GWR) is employed to identify the spatial heterogeneity in the relationship between various urbanization indicators and landscape patterns.
The results indicate that the degree of urbanization in the southeastern region of Zhangjiakou City is significantly higher than in other regions, with differences in indices such as people's livelihood and residential development being the main reasons for urbanization differentiation. In interpreting relationships, Geographically Weighted Regression (GWR) effectively identified spatial heterogeneity. The strongest urbanization responses were observed in the agricultural landscapes and the forest-agriculture ecological transition zone of the northwestern part of Zhangjiakou City, indicating that the ecology of this region is relatively fragile. The residential development index within the urbanization index directly influences landscape patterns, while other significant influencing factors vary by region. Our findings hold substantive import for urban managers and landscape planners in promoting targeted sustainable new urbanization development and optimizing landscape ecological functions.

Keywords: Landscape metrics, Urbanization mode, GWR

Cultivating Resilience through Landscape and Heritage Conservation: The Larissa Case-study

Maria Markatou
MARIA MARKATOU

Resilience refers to the ability of individuals, communities, or systems to withstand, adapt to, and recover from adversity or significant challenges. Resilience isn't simply about enduring hardships; it also encompasses growth, learning, and positive adaptation in the aftermath of adversity. Cultivating resilience through landscape and heritage conservation involves recognizing the value of preserving cultural, historical, and natural landscape and heritage as a means of fostering community strength and adaptability in the face of challenges. For example, landscape and heritage conservation contributes to resilience-building through, among others, creating and promoting a sense of identity and belonging. More analytically, heritage sites often hold significant cultural and historical value for communities. By preserving these sites, communities maintain a sense of identity and belonging, which can serve as a source of strength during times of adversity.

The above concepts are examined, tested and implemented for the region of Larissa in Greece. Larissa is a traditional geographic and modern administrative region of Greece, comprising most of the ancient region of the same name. It is a principal agricultural centre and a national transport hub, linked by road and rail with the port of Volos, the cities of Thessaloniki and Athens. The municipality of Larissa has 164,381 inhabitants, while the regional unit of Larissa reached a population of 269,151 based on the census of 2021. Legend has it that Achilles was born here. Hippocrates, the "Father of Medicine", died here. Today, Larissa is an important commercial, transportation, educational, agricultural and industrial centre of Greece. The area straddles the Pineios river while north and north-east of the rea are the Mounts Olympus and Kissavos.

The paper following a dual methodology, which relies on both primary and secondary data, proposes and presents a landscape "palimpsest". The concept is being used metaphorically to describe something that bears visible traces of its earlier forms or layers. In a broader sense, a palimpsest can refer to anything that shows evidence of its history or previous iterations beneath its current state. For example, a city might be described as a palimpsest if its architecture and layout reveal layers of different historical periods and cultural influences. Our "palimpsest" comprises of interconnected landscape elements, of important cultural, economic, historical, natural social value, which come from different thematic levels and which define and create a variety of real and non-real (mental) destination routes and stops on them.

Keywords: Cultural conservation, Heritage, Greece, Land Planning, Resilience

Exploring Climate Change Effects on Bird Diversity: A Landscape-based Approach

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In recent decades, the degradation of natural habitats and climate change have posed significant threats to global biodiversity, especially in urban areas. With unrelenting climate change, understanding its impact on urban species communities becomes increasingly crucial. The objective is to explore the spatiotemporal relationship between avian diversity and various prospective climate scenarios using a landscape-based approach. Focusing on the Beijing municipality, we categorized 56 resident bird species into three ecological groups: forest specialists, wetland specialists, and generalists, defining 63 landscape types based on land cover composition and configuration. Using a combination of species distribution models (SDMs) and graph theory, we evaluated avian species richness and habitat connectivity under four integrated SSP-RCP scenarios (SSP1-2.6, SSP2-4.5, SSP3-7.0, and SSP5-8.5), and identified priority conservation areas. The results indicated an anticipated average decline of 1.2% in birds richness and 1.02% in habitat connectivity, posing significant challenges to urban biodiversity. Notably, wetland specialist populations emerge as one of the avian groups most significantly affected by climate change, emphasizing the necessity for targeted conservation efforts in wetland habitats. Furthermore, we observed that at least 2949.32 square kilometers (including 17 landscape types) require conservation attention in 2050, primarily encompassing forest landscape types. Specifically, SSP5-8.5 scenario exhibited the fewest suitable habitat landscape types for avian populations, suggesting heightened landscape requirements in this scenario. Through graph theory analysis, we discovered that converting certain landscape types can enhance connectivity among multiple avian populations, providing guidance for future landscape management and conservation strategies. This study highlights the urgent need for urban biodiversity conservation in the context of climate change and emphasizes the necessity of proactive measures to sustain and promote the survival and reproduction of urban bird species.

Keywords: Biodiversity conservation, Global future climate models, Birds communities, Habitat connectivity

Urban Heat Island Analysis in Winter: The Case of Izmir

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Global climate change is seen as one of the most important environmental, social and economic threats facing humankind. At this point, all nations are making significant efforts not only to mitigate but also to adapt to the impacts of climate change. The Mediterranean Basin, where Turkey is located, is one of the most vulnerable and priority regions against climate change. In the basin, average temperatures are rising much faster than the global average (20% faster than the global average) and are now reported to be 0.4°C higher than the global average. In addition to this warming trend, regional warming due to human impact in cities where human activities are concentrated is remarkable. These regional warmings, which can also be expressed as the temperature difference of urban areas compared to the surrounding rural areas, are defined as the "Urban Heat Island Effect". The most important reason for this difference is shown as changes in the structure and function of urban ecological systems. Here, the temperature difference is generally experienced between urban areas with high building density and rural areas with high plant density.

There has been a great increase in scientific studies on the urban heat island in recent years due to its effects on living comfort and urban population health. However, recent evidence also emphasises the formation of urban heat islands during winter months. In addition to its microclimatic effects, the change in winter climatic conditions, which has vital effects on the life cycles of plants and animals, is also of great importance in terms of material cycles such as the recharge of freshwater resources. At the same time, scientific studies examining the relationships between the impact areas of winter warming and the spatial characteristics of the cities it is associated with are insufficient.

This study investigates the urban heat island formation and related factors in the case of Izmir city during the winter season since the 1980s. In this context, the coldest dates in ten-year periods were selected and heat-intensive areas were mapped. In addition to determining the spatial changes of these areas, their relationship with natural factors such as slope, aspect, elevation and urban factors such as distance to green areas, distance to roads and building density were revealed by correlation and regression analyses. The results obtained are expected to guide the policies and strategies that should be implemented to reduce the temperature values of urban heat islands in winter months.

Keywords: Urban Heat Island, Winter Season, Spatio-temporal variations, Correlation and Regression Analysis, On-site Variables

Framework for selecting areas in integrating wildlife into landscape planning

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The change in urban ecosystems, one of the areas most affected by environmental crises, poses a threat to wildlife populations' habitats. The alteration or loss of habitats adversely affects the future of all wildlife due to reasons such as threatening endangered species and providing a conducive environment for the widespread proliferation of invasive species with high adaptability to challenging conditions. Therefore, research efforts focused on enhancing urban wildlife become crucial. The aim of this research is to develop a framework that determines the areas requiring focus within urban environments where the negative impacts of environmental and natural factors are intensively observed, in order to establish a landscape planning approach for the preservation and support of wildlife. Birds, being species that are highly affected by changes in biological diversity and environmental conditions and respond rapidly to these changes, are chosen as the indicator species for the research. The case study of the research is Istanbul province. A four-stage framework was developed for identifying areas of focus in Istanbul. In the first stage, by using citizen science data and literature, areas and points where birds densely populated were mapped using geographic information systems. In the created dataset, the use of data based on expert observations was preferred to ensure data reliability. In the second stage, previously identified important bird areas were classified based on conservation statuses. Areas without conservation status were identified. In the third stage, a land cover change map was created by utilizing CORINE data to identify changes in land cover. Areas without conservation status were overlaid by the method of overlaying the CORINE land cover change map and the map of important bird habitats. Thus, a map of important bird habitats that were under threat and in need of protection was obtained based on urban development trends. In the final stage, each identified important bird area was evaluated in terms of habitat qualities. Additionally, the populations and land uses of the respective districts they were located in were taken into consideration in terms of anthropogenic impact. The areas were ranked based on their habitat qualities. The areas with high habitat quality or suitable for development for birds were selected.

Keywords: urban wildlife, landscape planning, urban birds

Mixed Method Approach to Landscape Design of Child-Friendly Green Space

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In recent years, the world has witnessed a significant increase in the frequency and severity of natural disasters. These events not only carry physical repercussions but also extend to impact social and emotional well-being, particularly affecting communities and children. Indonesia, as a disaster-vulnerable country, faces significant challenges in terms of preparedness, response, and recovery. The 2022 Cianjur Earthquake in West Java, Indonesia, significantly impacted communities, with an ongoing recovery process. Alarmingly, more than 37 percent of children under 15 years old lost their lives. Child-friendly school green spaces can play a vital role in aiding children's recovery from natural disasters. These spaces provide safe, comfortable, and supportive environments where children can learn, play, socialise, and heal. This research aims to develop landscape design criteria and guidelines for child-friendly schools green space in natural disaster-vulnerable areas in Indonesia, focusing on elementary school environments in Cianjur, impacted by the 2022 earthquake. This study explores the principles and elements of landscape design prioritising the needs, preferences, and well-being of children in disaster-prone areas. Using a mixed-method approach involving qualitative and quantitative methods, data will be gathered from children, parents, teachers, and other stakeholders. The research findings are expected to significantly contribute to the field of landscape design, providing a new and innovative approach to guidelines and prototypes for designing school green spaces. This contribution is important to promote children's recovery from natural disasters, emphasising the importance of community involvement in the design process. Green Spaces have the potential to provide social support and enhance community resilience through certain landscape designs' spatial elements, particularly in school environments. The proposed guidelines will be designed to be flexible and adaptable to different contexts, including different types of natural disasters and various school environments. The results of this study offer alternative solutions, including analysis criteria and design considerations, integrating governments and stakeholder development strategies at regional and national scales in Indonesia. These solutions can be applied in similar vulnerable contexts to improve the well-being of children affected by traumatic events.

Keywords: Natural disaster relief, landscape design, schools' green space, traumatic event

Mugnone River Contract: a tool for landscape and territorial development

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The Mugnone River is a common good of historical, economic, cultural and ecological significance and a resource of extraordinary value to the metropolitan area of Florence. Along its course, the stream connects the hills to the north with the city of Florence, crossing a rich countryside and offering countless opportunities for recreational activities. The 'Along the Mugnone' participatory research reconsiders the relationship with the river and proposes a shared vision for the future. The proposal envisions connecting parks and green areas through pedestrian and bicycle paths, trails along the river basin with water access points in a continuous public space 17.5 km long.

The initiative is aimed at supporting environmental protection, planning and urban land development policies in order to promote a participatory process aimed at the establishment of a 'River Contract'. The River Contract as defined in Italy by the National Charter of River Contracts intends to bring together the different stakeholders of the territory: the local authorities directly interested in the management of the river and the inhabitants in a pact for the rebirth of the river basin, calling the institutions and private individuals to an integrated vision of those who perceive the river as a “living environment” (European Landscape Convention - 2000) and therefore as a common good to be managed in collective forms.

The process leading to the development of a Mugnone River Contract has already been undertaken thanks to a participatory research process aimed primarily at activating a path of awareness and knowledge, which, starting from a group of citizens and a network of local will allow to overcome a vision of the stream linked to hydraulic and hydrogeological risk and promote the rebirth of the river as an identity heritage and a tool for territorial development.

Four goals of the project define a framework that gives equal priority to accessibility, equity, ecology, and shaping the identity of the Mugnone River:

1. A SAFE AND CONNECTIVE CORRIDOR: Public space along the river will connect communities along the stream and be enriched with trails, new parks, and an active public space that can provide opportunities for improved wellness, fitness, soft mobility and community cohesion.
2. A COMMON GOOD FOR ALL: The idea is for the river to become accessible to people of all backgrounds, abilities and ages.
3. AN ECOLOGICAL REFUGE: Ecological restoration, park connectivity, land conservation, development standards and other tools will provide strategic and holistic approaches to protect vulnerable species and ecosystems, reducing habitat fragmentation and improving water quality.
4. A 'LIVING LEGACY FOR FUTURE GENERATIONS: The project will interpret the rich social and ecological history of the Mugnone River by introducing an adaptive model that will guide future land-use planning decisions.

The Mugnone River Contract may become part of the Pact for the Arno, the "contract of contracts" of the great Tuscan river. In this sense, 'Along the Mugnone' participatory research aspires to amplify the project's resonance into regional and local policies.

Keywords: green and blue infrastructure, river, public space, community engagement, social and ecological history

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Web site

https://partecipa.toscana.it/web/lungo-il-mugnone https://www.facebook.com/lungoilmugnone https://www.instagram.com/lungoilmugnone/

Simulating mangrove biomimetic landscapes for coastal defense in Capiz, Philippines

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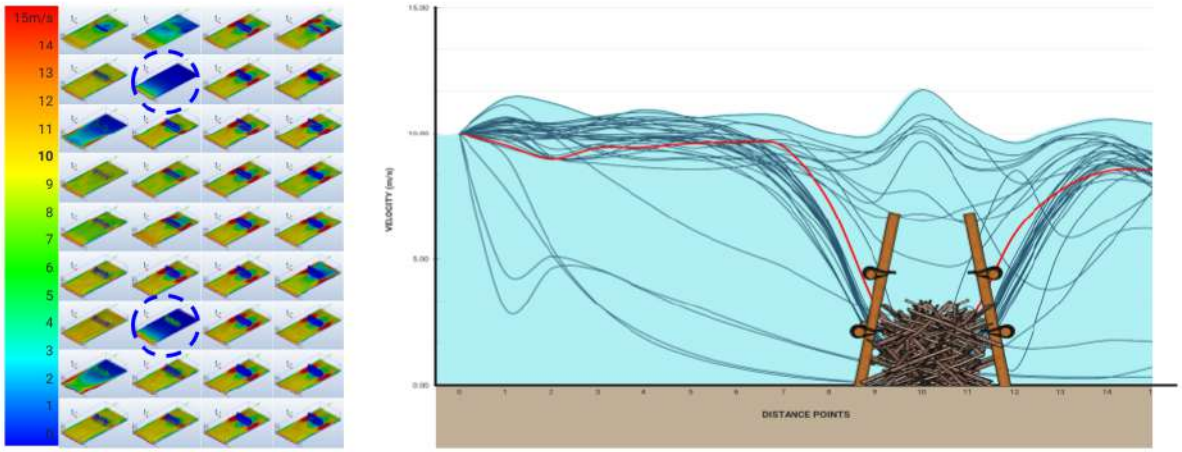
Mangroves play a key role in coastal defense. Despite this, mangrove forests are among the most threatened ecosystems globally. The Philippines is visited by an average of 20 typhoons annually, and yet almost 50 percent of our mangroves have degraded and need urgent rehabilitation. Faced with frequent storms and a retreating shoreline, the local community of Barangay Agojo in Capiz constructed a T-shaped bamboo fence on their coast. The bamboo fence attenuates waves and traps sediment, creating a secure base and shield for mangrove plantings. This study aims to remodel the Agojo Bamboo Fence based on mangrove biomimetic parameters and assess its resulting water wave percent velocity reduction. First, 36 permutations of varying bamboo diameter, height, and density were digitally modeled and subjected to computational fluid dynamics (CFD) simulation. Second, the optimal fence permutations were configured into different shapes and again subjected to CFD simulation. Lastly, the optimal fence shape configurations were CFD simulated with mangroves of different ages. The results of this study validated the Agojo Bamboo Fence Project and provided a promising approach to the simulation of bamboo fences for coastal defense and mangrove rehabilitation. With simulation data on optimal bamboo fences, the community of Barangay Agojo, Capiz can improve current practices, increase institutional support for mangrove rehabilitation projects, and encourage the adoption of bamboo fences in other coastal areas.

Keywords: Mangroves, coastal defense, biomimetics, bamboo fence, computational fluid dynamics

Results & Analysis Overview

The results, discussion, and analysis process encompassed data gathering on mangrove and site-specific conditions as boundary conditions and parameters for digital 3D modeling and computational fluid dynamics (CFD) simulation. Bamboo fence permutations were modeled and simulated to measure the percent velocity reduction of incoming water waves as it passes through the structure. The fence unit permutations that displayed the highest water wave percent velocity reduction were then modeled into 3-segment shape configurations, and again subject to CFD simulations to identify the shape that resulted to the highest water wave percent velocity reduction. Finally, mangroves of different ages were integrated with the optimal shape configurations to show how the integration of mangroves affected water wave percent velocity reduction.

Simulation results visualization



(Left) Visual results are shown from a scale of 15m/s to 0m/s (red to blue). From visual inspection alone, all fence unit permutations suggest a decrease in velocity as water passes through the structure. (Right) Velocity change from Point 0 to Point 15, all permutations. The average velocity reduction decreases gradually as we move down the dataset, indicating that subsequent permutations have a lower impact on reducing velocity.

ORAL PRESENTATIONS

Cultivating Resilience: Sustainable & Resilient

Case study of Los Angeles Sustainability Plan towards sustainable urbanism

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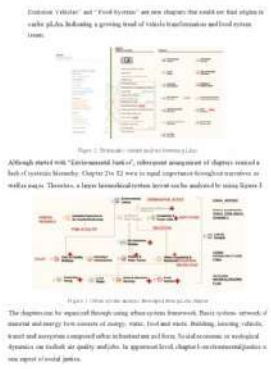
This paper demonstrates City of Los Angeles Green New Deal (pLAn): Sustainable City plan's contextual alignment with sustainable urbanism (SU) design principles. The essay uses sustainable urbanism as basic knowledge structure to understand the principles. Based on the "planner's triangle", planetary boundary, resiliency planning and urban metabolism, objectives are set to identify coherence and disparity between Los Angeles sustainable city plan and sustainable urbanism design principles, then put out critics and suggestions in the process of fulfilling sustainable urbanism principle requirement. pLAn is overall a well-organized and explicit system target framework, but the major intention is still on the way of achieving sustainable development targets rather than setting sustainable urbanism to be the final destination. It integrates well with 17 United Nations Sustainable Development Goals in each of localized chapter, showing the responsibility of climate leader and city actions. In achieving the urbanism practice, the pLAn still calls for additional actions such as organizing the chapters with scale and hierarchy, bearing an urban boundary concept such as capacity in mind and designing systems with circular strategies and coordinate with each system to realize active balance. Instead of setting percentages on reduction, it was suggested that a powerful tool with hierarchy layers to track average ecological footprint can be created to provide data for future environmental gains.

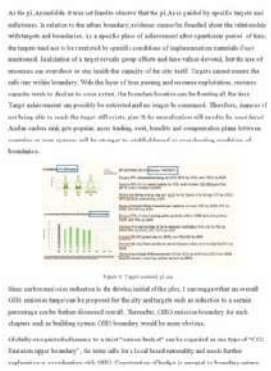
Keywords: sustainability, sustainable urbanism, Los Angeles, urban planning, sustainability plan

Case study of Los Angeles Sustainability Plan towards sustainable urbanism

Whole research paper including abstract page 2

Case study of Los Angeles Sustainability Plan towards sustainable urbanism





Whole research paper including abstract

Multıdıscıplınary Researches On Landscape Art And Sustaınabılıty In Ancıent Landscapes

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The act of sustainability in ancient landscapes characterizes the continuity of cultural heritage. It continues its existence through urbanization and expansion planning and protection of structures and areas inherited from prehistoric times to the present day. While human factors and actions play a role in the maintenance of ancient structures. This study requires examining the changes in plant corridors and landscape patterns in ancient landscapes during the archaeological process and their current situation. In this context, examination of plants in ancient areas and archaeobotanical activities are also required. The aim of this is to identify extinct and endangered species by examining the archaeological journey of vegetation. In this context, it provides data for biodiversity. In addition, it creates design criteria in ancient landscapes by examining garden culture, the state of landscape art and its sustainability from ancient times to the present.

Within the scope of th study, 9 ancient Cities were selected. These Cities were chosen because they best reflect landscape art and garden culture and continue to exist today. At this point, importance has been given to include areas where data are available regarding the use of ancient structures for various purposes today. Selected ancient Cities were examined through photographs and correlated with literature data.

In line with all these data, this study; It reveals the result of a holistic study that combines the professional disciplines of archeology for the study of ancient sites, archaeobotany for the study of archaeological plants, ethnobotany for the interaction of vegetation with culture and civilization, anthropology for sociological approaches, and landscape architecture for landscape art and design criterias. This study is important because it provides data on landscape character and design by ensuring the preservation and continuity of historical and cultural heritage within the professional discipline of landscape architecture. It is also important that different professional groups are included in the research to be conducted and thus rich data is presented to the literature.

Keywords: Suistainability, Ancient landscapes, Multidisciplinary Researches

URDX: Pioneering User-Driven Regenerative Design Experience in Landscape Architecture

Damian Tang
URDX Studio

INTRODUCTION: This abstract presents URDX - User-driven Regenerative Design Experience - a pioneering platform that integrates neuroscience and human survival instincts into landscape architecture. URDX offers a transformative approach in designing spaces that are not only aesthetically pleasing but also regenerative and responsive to user needs. Additionally, with a specific target audience in mind, such as those impacted by mental distress, dementia, or ADHD, URDX can be combined with a particular design methodology to curate a conducive and therapeutic environment to aid the recovery of these patients.

OBJECTIVE:
The goal is to explore the implications and potential of URDX in revolutionizing landscape architecture, focusing on how it enhances human interaction, experience, and well-being in both built and natural environments, contributing to a therapeutic environment.

METHODOLOGY:
URDX applies the award-winning PRIMExp principles, grounded in neuroscience, to create spaces that adapt and regenerate according to human interaction, mental conditions, and environmental factors. This user-driven approach ensures that each design is responsive to the specific needs and dynamics of its audience and location.

RESULTS: URDX's application extends from intimate indoor settings to large-scale outdoor environments, showcasing versatility in fostering regenerative and healing spaces. Case studies demonstrate its effectiveness in enhancing user experience and well-being, while contributing to sustainable and adaptable landscape designs.

DISCUSSION:
URDX challenges traditional landscape architecture by introducing a user-centric, regenerative model. This approach not only enhances aesthetic and functional aspects but also promotes environmental sustainability and resilience, creating spaces that evolve and improve in response to human and ecological needs.

CONCLUSION: URDX is a groundbreaking step towards a future where landscape architecture is not just about designing spaces but creating living, regenerative environments that adapt and grow with their users. It represents regenerative design from a human and social performance perspective, aiming to inspire and motivate with a positive impact. It marks a significant shift towards more empathetic, sustainable, and user-responsive design in the field.

Anticipated Contribution to the IFLA World Congress:
This presentation will provide insights into how URDX can be integrated into landscape architectural practices, offering a fresh perspective on designing spaces that are user-centric

and regenerative. Beyond landscape, URDX has also been applied in architecture, interior spaces, urban design, and is now exploring applications in engineering. It aims to inspire professionals to adopt approaches that prioritize human experience while contributing to ecological sustainability and resilience.

Keywords: Neuroscience, therapeutic, biophilic, human-centric, regenerative design

Winter Glamping in Kuwait's Desert Landscape

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The desert has long been an integral component of Arabian culture and a fundamental aspect of their way of life. Following the discovery of oil in the 1938, Kuwait underwent accelerated urbanization and residents established themselves in newly developed metropolitan areas. The desert in Kuwait now serves as a popular seasonal destination during the winter season. These recreational pursuits pose a threat to the delicate desert ecosystem. "Kashta" has taken many different shapes and forms, from simple tents to extravagant resort setups. The formerly primitive desert living has been replaced by a landscape that caters to demands of organizing lavish modern events. The demarcation of land during the officially sanctioned winter camping period in Kuwait has seen the buildup of concrete bases, toilets, and the elaborate furnishing of tents, resulting in polluting remnants left behind. This presentation examines the effects of recreational desert activities on the long-term viability of the desert ecosystem in Kuwait with a focus on AlMutla'a, the highest peak in Kuwait and a popular camping site. This study aims to gain deeper insights into the aftermath of the winter camping season and to suggest sustainable strategies for future management. Aerial photographs were taken during and after the camping season to understand the changes in the ground surface condition. Also research was done on Kuwait Municipality's bylaws, the authority in charge of winter desert camps. The desert environment today is both a result and a catalyst of socioeconomic and cultural intricacies. Given the ongoing evolution of technology and culture, it is imperative to carefully examine the consequences of these consumption behaviors towards the landscape.

Keywords: Campsite, desert, tents, Kuwait, Glamping

Working Informally: The Role of Landscape Architects in Informal Upgrade

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Yes And Studio, Cape Town, South Africa

Informal settlements are a global urban phenomenon representing the most prevalent form of contemporary city making. In Cape Town, South Africa, where this study is based, There are approximately 146,000 households in 437 informal settlement pockets. Many of these settlements were established before democracy but are still not legally recognised with residents lacking tenure security and access to basic services. Furthermore, globally, informal settlements are at the climate change coal face, with settlements in Cape Town experiencing annual winter flooding with the associated spread of disease exacerbated by insufficient infrastructure and poor quality public spaces.

These settlements urgently require attention to ensure that residents can live with dignity, with access to basic services, such as water and electricity and with safe public environments in which to live. To this end, local governments, NGO groups and implementing agents need to shift the status-quo approach to informality away from formal housing resettlement and "community making from scratch" to a more sensitive in-situ based upgrade process that allows for incremental intervention with a greater focus on collective design responses to community identified challenges. These in-situ based interventions necessitate a new design approach that recasts designers as facilitators of the upgrade process and places a greater emphasis on community-based knowledge. This de-emphasises a top-down approach has the potential to challenge the imbalance of power held by professionals and acknowledges that community members living in informal settlements have important skills to contribute to their own upgrading process.

This paper focuses on the case study project: "Europe Informal Settlement - Water Point Upgrade" and puts forth that Landscape architects should be thought leaders in this field as informal upgrade necessitates: marrying knowledge of evolved and emergent systems with sensitive site solutions and climatic responses. In addition, landscape architects have the fostered ability to unlock community base knowledge to work collaboratively to form shared project ownership, to level power imbalances and ultimately to create a replicable approach to respectful, robust and resilient intervention. Furthermore it is put forth that the lessons learned from working in informal settings have applicability beyond their own contexts and that co-creation should be viewed as a best practice design tool when working within any community or group. Thus the tools developed from " working informally" could be used by all landscape architects designing with communities

Keywords: Informal settlement upgrade, co-creation, landscape infrastructure, public realm upgrade

Desakota and the possibility for a wet electricscape

Alessandro Martinelli
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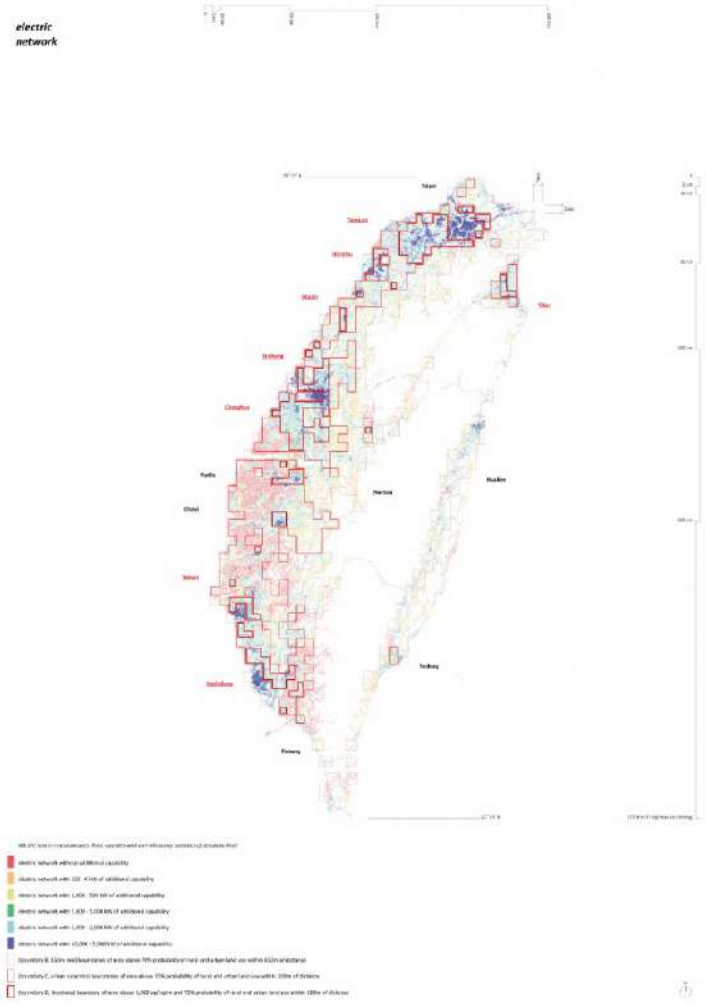
Looking at recent prospects of development, some scholars expect that desakota will represent large shares of future world urbanization. Born out from research about large urban regions in Asia, this is a model of urbanization based on the compresence of 'in-situ urbanization' and persistent wet agriculture. Although highly debated, it actually portrays a landscape where urban and rural land uses mix together. Such a condition defies Western interpretative models. Indeed, it not only hosts advanced socio-economical communities but also frames an interplay of human and natural dynamics much more flexible than in normal urban areas or Western suburbs. It is produced by the overlap of centenary landscaping for wet agriculture, modern colonial infrastructure, and late but sudden urbanization dynamics animated by disruptive mobilities, such as those of two-stroke scooters. Anyway, first and foremost, it generates a unique landscape, i.e., a spatial heritage defined by a fine-grained and decentralized matrix of social, technical, and natural networks.
This landscape has entangled spatial qualities, although the local administrations hardly see them. In their eyes, the recent tendencies of urban primacy, the trust in Western planning models, and the governance challenges posed by the need for restructuring infrastructure and energy systems today -often dealt with blind faith in the liberalization of the public utility market- make them a developmental constraint. Holding no disciplinary habit for projective studies, the research and planning also disregard such qualities and their potentials. Finally, critical and no interdisciplinary approaches are somehow preferred. These are often despatialized or do not consider multiple sites or structures in terms of their potential interdependence.
Against this, the presentation will adopt a projective approach to showcase how the progressive miniaturization of the hydropower technologies let imagine that Asian mixed urban-rural land use areas might offer conditions for the public sector to develop a diffused initiative of distributed generation by hydropower. By this, both the compresence of urban-rural infrastructure and urban-rural land uses may find reasons to be strengthened rather than obliterated and the local spatial qualities change their institutional understanding in light of the challenges of decarbonization.
The paper will elaborate on the outcomes of an investigation concerning the potential of diffused mini-hydro development by the public sector within mixed urban-rural land use areas of the Taipei-Kaohsiung Mega-Urban Region, Taiwan, supported by the local Ministry of Science and Technology, grant n. 107-2410-H-034-036-.

Keywords: desakota, miniaturized-hydropower, distributed generation, resilient landscape urbanism.

Mapping of electric system of Taiwan - courtesy of Alessandro Martinelli



Mapping of water system of Taiwan - courtesy of Alessandro Martinelli

Perception and Valuation of Cultural Ecosystem Services of Agroecosystems

Tiffany Woods[1], Brent Chamberlain[2], Arthur Caplan[2]
[1]The Ohio State University
[2]Utah State University

This study investigates the valuation of cultural ecosystem services (CES) in agroecosystems by residents of two communities along the Wasatch Front, Utah, USA (Salt Lake City metro area), highlighting the often-overlooked non-market values these lands provide. Despite the recognized importance of agroecosystems in providing a range of ecosystem services, traditional management practices have largely focused on the market value of crops, neglecting broader public goods. In this study we quantify the valuation of different CES (e.g. aesthetic, education, heritage, inspiration, recreation, spiritual) to determine trade-offs between these services. Through a robust random sampling method (sample size = 982, response rate 11%), we explore residents' activities versus their motivations for visiting farmland or rangeland across a range of CES. Our demographics varied across gender, education and income with other variables included in the study. Utilizing descriptive statistics and principal component analysis, we categorize CES values into 'multifunctional' and 'traditional' cultural amenities, corroborating previous findings on agricultural land-use preferences.

Our research emphasizes the crucial role of Cultural Ecosystem Services (CES) in agroecosystems, highlighting their value to local communities and the necessity for their consideration in land management and planning. Key findings reveal that aesthetics is the highest motivating factor for visiting, followed by inspiration, heritage and social factors. However, motivations and activities associated with CES vary by location, reflecting the influence of social and cultural values on CES valuation. This underscores the complexity of CES engagement, necessitating the use of multiple socio-cultural prompts in research to capture the full spectrum of community values and interactions with these lands. The frequency of use was predominately engaged through walking, hiking, or running with a number of other uses identified (wildlife viewing, photography, etc.).

Our study supports the urgency of integrating CES into land-use planning to preserve peri-urban agriculture in regions undergoing rapid urbanization. Providing empirical evidence on household CES preferences, this research contributes to informed policy decisions for agricultural preservation, addressing critical gaps in Utah's land-use planning. It advocates for a nuanced approach that includes both the motivations behind and the participation in CES activities, highlighting the need for further research to standardize CES quantification and explore their synergies. This comprehensive understanding of CES values is vital for developing land-use policies that effectively balance growth with the preservation of valuable agroecosystems.

Keywords: Cultural Ecosystem Services, Agroecosystems, Land-use Planning, Agriculture, Values

Perceived Restorative Effects of Landscape Components on University Campus

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Mental health has been a primary concern for university students. According to the National College Health Assessment (2022), in the past 12 months, 51.7% of college students felt lonely, 72.4% suffered from psychological distress, and 27.6% seriously considered suicide. Among these students, only 34.4% received psychological or mental health services, which highlights a demand for more mental health support on campus.

Campus landscapes, such as gardens and open fields, allow students to take a break from their daily routine and provide spontaneous opportunities to meet other students, boosting their mental health. However, when it comes to campus design, there is little scholarly evidence for enhancing landscapes' healing effects. Previous health and design research focuses primarily on natural environments' sizes, accessibilities, and perceived proximities, with only a few studies exploring their quality, such as the diversity of plants, wildness, and canopy cover. As a result, the driving factors behind natural environments' restorativeness and whether some landscape components have better restorative effects than others remain unclear. These uncertainties leave landscape architects and urban designers wondering about creating environments that cope with increasingly severe health concerns among college students.

This study aims to answer three questions: 1) Whether landscape components have different capacities in providing restorative effects to college students, 2) If so, what is their relative importance to restorativeness, and 3) Do age, gender, education level, personality, and previous living environment influence students' perception of landscapes? We anticipate this study will inform campus landscape design that boosts college students' health.

A 3.5-acre experiment site on a university campus was selected. We created nine design scenarios, each including some of the seven common landscape components: trees, flowers, berms, water features, seating, trail, and animals. The quality of the designs was intentionally mediocre to reduce the impact of fascinating designs on people's preferences. A survey about students' perception of these design scenarios was created and spread to students in a university between January and May 2023. We received 579 respondents, among which 309 were valid and used for the Kruskal-Wallis Test.

The preliminary results show that the selected seven design components influence people's emotional experiences differently. The features "seating," "water features," and "trees" have the strongest correlations with feelings of fascination, relaxation, safety, and freshness. In contrast, the presence of animals either does not have a strong correlation or has a negative correlation with these feelings. Students pursuing doctoral degrees find it more difficult to be pleased by landscapes. Compared to females and males, people reporting the third gender are more likely to be influenced by different environmental components. Regarding the influence of age, people's preference for water features decreases slightly as age grows. Plus,

respondents in the “30-35” age group showed higher ratings for “trees,” berms,” and “seating,” More detailed analyses and discussion will follow.

Keywords: nature contact, mental health, college students, environmental wellness

Turkey's Potential Implementable Net Zero Carbon Model and Resilient Cities

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Creating sustainable and climate-resilient cities has become a crucial focal point. This is because our cities, including buildings, transportation and infrastructural systems, and natural areas within them, are negatively impacted by the impacts of climate change. As we adapt to present conditions and combat with climate change, the definition of sustainability within the architectural profession is evolving day by day.

Architectural approaches, design and practices are evolving and developing in the combat against climate change. This study aims to establish a potential implementation model for the "Net Zero Carbon (NZC)" approach, which can be described as the ultimate point of an energy-efficient building approach, at both the building and city scales (macro and micro level) for buildings and their immediate surroundings in Turkey. This study is also prepared with the goal of emphasizing once again the necessity for the involvement of not only the building itself but also its surroundings in the design and implementation processes, in order to achieve the targeted reduction in carbon emissions in Turkey's construction sector.

In formulating the proposed model in this study, guidance is taken from the 17 Sustainable Development Goals (SDGs) published by the United Nations, which are universally applicable across sectors, and the reports of the Intergovernmental Panel on Climate Change (IPCC). Metropolitan municipalities and local governments located in environmentally diverse regions in Turkey are explicitly identified as the target audience for this study.

In the field of architecture in Turkey, no existing implementable or proposed model related to the Net Zero Carbon Building or Net Zero Carbon City approach has been encountered in the literature review. What makes this study valuable is the emphasis on the fact that the central focus is not only on buildings but also on the evaluation of their immediate surroundings within the framework of the Net Zero Carbon Approach. In the future presented implementation model, parameters of not only the building but also its surroundings have been used to achieve a fully comprehensive Net Zero Carbon approach. These parameters directly relate to green infrastructure systems, transportation, waste management, and sustainable management in regions covering specific settlement areas, as mentioned in the literature as Net Zero Community or Neighborhood. In the Net Zero Carbon Building approach, the model focuses solely on the building by ensuring energy efficiency for zero carbon emissions, using renewable energy sources, employing energy storage systems, utilizing sustainable building materials, and aiming for zero carbon emissions during construction, operational, and construction phases. It is believed that a holistic model for both the building and its surroundings is more favorable. Integration of both aspects is crucial. The presented application approach in this study leverages the Sustainable Development Goals as a guiding framework, addressing parameters of both Net Zero Carbon Buildings and Net Zero Carbon Communities, proposing an initial model for use in Turkey. Considering the fight against the impacts of climate change to create sustainable and resilient cities and to provide good examples of implementation, embracing the Net Zero Carbon approach is crucial.

Keywords: Net Zero Carbon Building, Resilient City, Sustainable Building Practice, Net Zero Carbon Community

Metropolitan Public Space Network in Lisbon: a linchpin for resilience?

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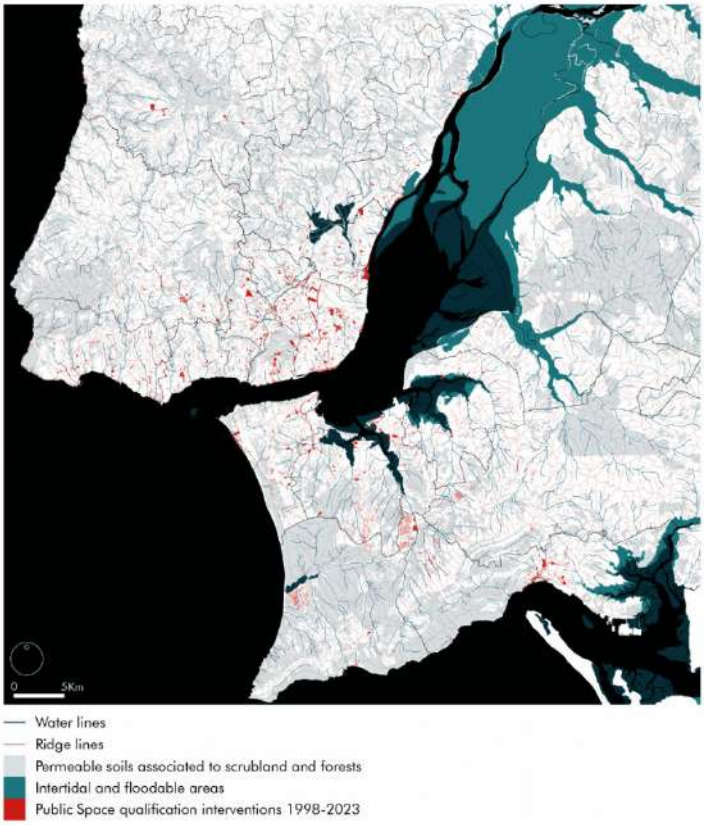
Green and blue infrastructures play an important role in the metropolitan context, given the challenges related to the densification and extension of urban sprawl. Consisting of functional landscape networks, they are fundamental for maintaining flows of biodiversity, water and energy (Balestrieri and Ganciu, 2017), which are essential for responding to the challenges related to maintaining and strengthening sustainability, resilience and the capacity for adaptive responses to climatic or other risk events (EC, 2013), particularly risks related to climate change in urban environments.

OBJECTIVES:
This study aims to explore the role of public space qualification projects as a synergic vector for the optimization of landscape systems and ecological performance within the Lisbon Metropolitan Area. Focusing on green and blue infrastructures, the study considers that the provision of ecosystem services within a consistent metropolitan ecological structure, as defined in Franco et al. (2013), can be reinforced by the public space qualification projects identified and mapped throughout the MetroPublicNet research project (Santos and Matos Silva, 2021).
METHODS: In this analysis, public space qualification projects within MetroPublicNet GIS database are cross-referenced with the regional ecological structure proposed for the LMA. Three groups of public space 'spatial types' (Santos et al., 2024) were considered: a) all types of MetroPublicNet public spaces; b) the set of interventions related to green spaces: creation or improvement of parks and green spaces and water regulation, green infrastructure, and urban agriculture; c) the set of interventions related to waterfronts; and areas covered by one or more classes of ecological structure (Franco et al., 2013), paying particular attention to the 'wet system' class.
By using the collected information and associated spatial mapping, green and blue infrastructure synergies in relation to the Lisbon's metropolitan ecological structure were accessed. Its results lead to a spatialized overview and quantification of the LMA public space requalification projects that due to their coincidence with sensitive areas, are an obvious opportunity to reconcile human appropriation of the territory with its ecological values.
DISCUSSION:
Public space interventions related to green and blue infrastructure, and that are in great extent coincident with valuable features of the landscape systems that integrate the metropolitan ecological structure, stand out in more recent years, revealing a change in the political and planning priorities, from a focus on providing local amenities towards a more comprehensive role of the urban green and blue infrastructure, namely as a tool to prevent urban floods and its consequences, and to adapt to climate change (Matos Silva and Costa, 2018). Its role as vectors that can effectively contribute to landscape systems safeguard and optimization is critically assessed, hoping to contribute to pinpoint its importance concerning the response to the environmental robustness enhancement in the LMA.

Keywords: Public Space, Lisbon Metropolitan Area, Green and blue infrastructure, MetroPublicNet, resilience

MetroPublicNet Public Spaces overlaid on LMA's green and blue infrastructure



Renaissance to restoration: nature-based solutions and the resilient city

Jane Welsh
Committee on Climate Adaptation, Canadian Society of Landscape Architects; IFLA (Special Envoy to the International Association of Horticultural Producers (AIPH)); Toronto City Planning, Toronto, Ontario, Canada

As cities throughout the world are dealing with the immediate and future impacts of the climate and biodiversity crisis, we need to aggressively change our approach to city building.

This change requires a collaborative approach between many disciplines and starts with shifting our expectations on the urban built form. It requires advocacy, progressive regulations and incentives, and a focus on design that is sustainable and enhances ecosystem processes. Landscape architects, as the profession trained to 'design with nature', are key to delivering sustainable design solutions, from master planning to site design, that are both functional and beautiful.

This presentation will highlight how Canadian landscape architects are advancing reformative change and innovative solutions to address the climate and biodiversity crisis in Canada's cities. The focus of the presentation will be on the emerging 'revolution'. CSLA members will share what is working, in development or imagined, to enhance and protect biodiversity and mitigate the impacts of climate change in our cities. They will share stories about their experiences and their challenges, and the tools and resources that they find most valuable – with a hope to inspire and motivate attendees. The intent is to highlight the need for all landscape architects to continue to evolve, grow and adapt our practices by promoting biodiversity and responding to climate change.

The presentation format will include a series of short interviews (videos), project examples and emerging and tested resources to highlight the work of Canadian landscape architects who are addressing global challenges through research, design, implementation and changing the rules.

Keywords: cities, revolution, Canada, collaboration, nature.

Submerge Knowledge and the Impact on Environmental Justice and Stewardship

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Programs in Landscape Architecture, University of Texas at Arlington

The resiliency of vulnerable communities is intrinsically intertwined with the social and cultural contexts that shape both the approach and responses to environmental and economic threats. This presentation will discuss how the solutions to the problems of place, be it the threat of storm surge or coastal erosion, should be rooted in the ecology, culture, and history of these places and the people that have shaped these factors. Often lessons, answers, and examples are better found using a connection to the people of the place in need, resulting in an empowered and independent community, more equipped to be stewards of their environments. Those who practice design activism must be willing to share knowledge and tools and to defer to those who inhabit these vulnerable spaces. In threatening conditions, especially during disaster recovery, communities are desperate for help and give much over to others, often submerging native narratives to get assistance. This submergence often leads to solutions that need to be more sustainable or stewardable. In “Climate Change, Culture and Cultural Rights," written in preparation for a report by the UN in 2020, Justine Marrion Massey, the University of California Davis Law School, articulates this concept well and pushes for localized responses to threats from climate change. She says, “Culture has a critical role to play in humanity's reaction to climate change. In this time of forced editing of cultural practices, individuals and their values will be put to the test. What will be preserved? What will be sacrificed? What people decide to prioritize individually, locally, regionally, and internationally will determine what change will look like”.

The case of New Orleans will be presented, and the historical, technical, and cultural knowledge necessary for solutions to storm surges and flooding that lies in the wetlands adjacent to the city. These are the same wetlands through which the waters impacted by Katrina surged, bursting floodwalls, and inundating the city. These wetlands hold the history and knowledge of the ancestors. In Louisiana, the swamps and wetlands were the landscapes in which ex-slaves implemented social and spatial practices against subordination and for landscape preservation. Several maroon communities occupied the Bayou Bienvenue Central Wetlands in Orleans and St. Bernard Parishes in the 1700 and 1800s (Figure 1). For those taking the risks of this environment, the wetlands offered a safe harbor from authority and persecution. Many took the risk of this landscape, including Louisiana's historic indigenous Indian tribes, the Acadians, who settled in the wetlands after being driven out from coastal Canada by the British beginning in 1755, and enslaved Africans seeking freedom. The abundance of resources within the swamp made the development of distinct cultures possible and the sharing of knowledge for survival within the unique landscape. How we can apply this historic ecological knowledge to today’s issues of climate resiliency will be presented.

1. Massey, Marrion Climate Change, Culture and Cultural Rights. In Preparation for the Report by the UN Special Rapporteur, May 15,2020. https://www.ohchr.org/sites/default/files/Documents/Issues/CulturalRights/Call_ClimateChange/JMassey.pdf

Keywords: Resiliency, historic communities, wetlands, submergence

Maroons in Wetlands, Figure 1

Amistad Research Center, Tulane University

Maroons were ex-slaves who liberated themselves, choosing freedom and communal ways of life.

David Edward Cronin

See abstract for location of figure

Water Consumption for Irrigation in the Case of Adanalıoğlu, Çukurova

Fırat Fırat, Beyza Sat Gungor
Özyeğin University, Faculty of Architecture and Design

There are traditional irrigation systems in the Çukurova Agricultural region that do not consider energy and water consumption. With the water lack effect of climate change, this situation creates a huge problem in water and energy consumption. The study aims to determine optimal irrigation strategies and energy consumption for the region. The study addresses the sustainability of industrial farming across seasons, particularly in plain farm areas. Focused on water resources and their distribution, the research categorizes the irrigation topic into systems, distribution, and sources and encompasses an assessment of four principal sources of agricultural irrigation, namely, Open Canal Network (OCN), Collecting Pool (CP), Underground Water (UW), and Pipe Distribution Network (PDN). In the case of UW and CP, the water sources are located within agricultural lands, and the landowners manage their installation. Conversely, for OCN and PDN, the water typically originates from lakes or reservoirs and falls under state-funded infrastructure projects. Despite these irrigation sources varying in scale, the regional scope of this study allows for a proportional analysis of smaller-scale irrigation sources relative to the area.
The government's role in providing infrastructure or utilizing state-owned resources for water sources and distribution is explored. Four main systems of irrigation channels are examined through regional consumption predictions and simulations. The comparison emphasizes energy consumption and water loss, overlooking habitat impact and humidity levels. Adanalıoğlu village in Çukurova, Mersin is the case research area. Data in consumption is calculated at the neighborhood level, considering variables such as well acreage, water pump types, and agriculture type. GIS and QGIS plugins facilitate processing and simulation, utilizing real energy usage data. The study aims to evaluate the efficiency of irrigation systems based on energy and water consumption, providing insights into the most effective approach for sustainable agriculture in the Çukurova Agricultural region. The study assesses the existing system and simulates alternative options to determine optimal irrigation strategies for the region.

Keywords: Agricultural applications, irrigation systems, wastewater, water consumption, Cukurova

Design scenarios for floating architecture to mitigate, adapt climate change

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As the world's population continues to grow, the destruction of green areas is increasing, aggravating the effects of climate change. Climate change impacts human systems and ecosystems, including extreme weather events, floods, droughts, glacier retreats, loss of species, ocean acidification, and more. Among these impacts, rising sea levels are one of the most devastating effects of climate change. The rise in sea level poses various challenges for countries, including land submergence, displacement of maritime borders, potential economic losses, and millions of people being at risk of becoming climate refugees. Cities built on the sea can be an innovative mitigation and adaptation to climate change and rising sea levels.

Designing a city on water requires many advancements and technologies like water purification, green energy, and efficient use of spaces. These can be a part of the mitigation aim of the floating architecture and minimize the adverse effects of natural disasters like floods and earthquakes. Also, by transferring cities on water, land areas occupied by cities can be returned to nature, and life on land can flourish. Earth can move into a more sustainable future where it can heal itself. All these items also align with the UN's Sustainable Development Goals that aim for a better and sustainable future. The components of a floating city (energy production, mooring, desalination systems, material, function distribution, land integration) can be examined and advertised according to their potential to mitigate or adapt to climate change, resilience to natural disasters, and SDGs' relation to achieving more local solution-based designs.

Keywords: Floating Architecture, Sea Level Rise, Sustainable Development Goals (SDGs), Climate Change Mitigation, Climate Change Adaptation

Te kori a te kō redefining our sustainable, prosperous future

Debbie Tikao
Tuia Pito Ora New Zealand Institute of Landscape Architecture; Te Rūnanga o Ōnuku

In January 2024, Ōnuku Rūnanga (Māori council of Akaroa Harbour in the South Island of NZ) held its first Te Kori a te Kō - Climate Change Adaptation Wānanga (meeting/workshop) in the sweltering heat - a stark reminder of the kaupapa (purpose/foundation)) at hand. The wānanga was held at Ōnuku Marae (communal space) and home to sub-tribes Ngāi Tārewa and Ngāti Īrakehu. For three days Ōnuku hosted workshops, expert panel discussions, and activities. The wānanga brought together whānau (family), community leaders, climate science experts, local government representatives and freshwater ecologists, to share ideas, fears, expertise and to start the conversation of how we can work collaboratively to shape a more resilient future.

Te Kori a te Kō is the name of an indigenous led climate change adaptation program which is inspired by the past, reaching into origin stories, and gives voice to the connection to whenua (land) and moana (sea). It encapsulates five projects, all of which are centered on Akaroa Harbour as the compass, teacher and guide for this kaupapa. The five projects are interwoven to break down silos and apply holistic, multi-objective planning and thinking to climate change adaptation.

Te Kori a te Kō flips climate change adaptation planning on its head. It integrates both bottom-up and top-down frameworks, but most importantly, it starts with action. From its conception, Te Kori a te Kō came from the position, that hapū members would never read a plan, many were either frightened or disinterested in climate change. As such, a different approach to engagement had to be taken. The other position taken, was that mātauranga taiao (traditional ecological knowledge) and Western science had to be woven together and that growing knowledge in both is a critical component in building climate resilience.

The five projects of Te Kori a te Kō are all action focused, from installing māra kai (productive gardens), research, gathering stream data based on traditional practices and observations, through to planting days and designing whare (home) resilience plans, each activity and project has been designed to build knowledge of climate change whilst physically engaging in shaping a more resilient future. What we have learnt, is that action empowers people. By doing, people are more engaged, and feel more positive about making a difference.

The presentation will take you on a journey of the principles of Te Kori a te Kō, the process taken to date, the learnings and outcomes of the first wānanga, and where we plan to go next.

The Chairperson of Ōnuku Rūnanga, Rik Tainui, notes “Te Kori a te Kō lines up beautifully with our iwi whakataukī (proverb) – Mō tātou, ā, mō kā uri ā muri ake nei (for us and our children after us).

Keywords: Resilience, community, mauri, collaboration

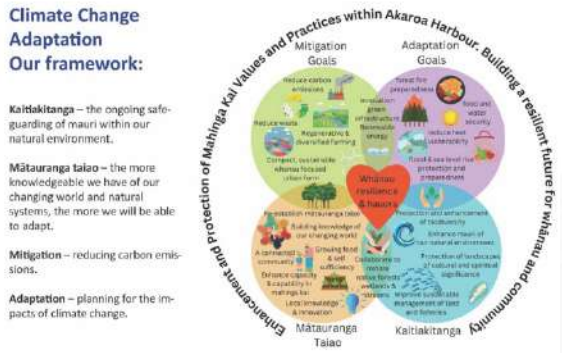
Te Kori a te Kō slide 1

Te Kori a te Kō slide 2

Te Kori a te Kō slide 3

Te Kori a te Kō slide 4

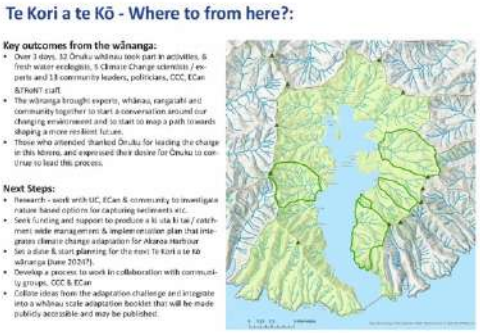
Te Kori a te Kō slide 5



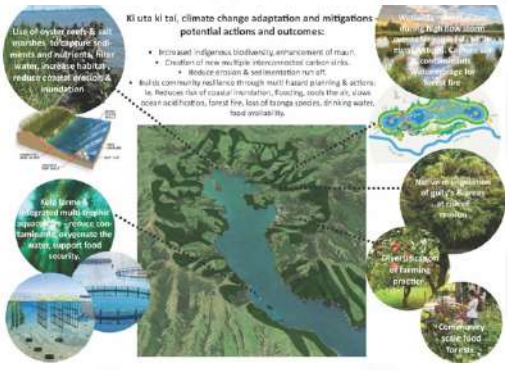
Te Kori a te Kō slide 6

Te Kori a te Kō slide 7

Te Kori a te Kō slide 8



Te Kori a te Kō slide 9



Te Kori a te Kō slide 10

Vasikkasaari Urban Eco Island

Varpu Mikola, Laura Tuorila, Caroline Moinel
Nomaji Landscape Architects Ltd

The nature path structures and resting spots of Vasikkasaari island are part of the Urban Eco Islands project. The initiative strives to create new solutions for sustainable nature travelling. Intelligent solutions and applications are intended to be used to monitor the condition of the nature, the number of visitors and to encourage people to observe the nature via mobile application.

The designed path structures guide the visitors to the highlight points and places on the island while also preserving the delicate local vegetation. Three different types of subtly located resting spots were designed, drawing inspiration from the landscape and view of each selected spot. The structures were not designed to attract too much attention into themselves, but rather to the place and the views.

The northernmost resting spot is located on a bare bedrock with a view to the silhouette of Helsinki. The bench, table and terrace create a uniform structure which serves as a place for resting even for larger groups. The surrounding bedrock is a natural extension area for the visitors.

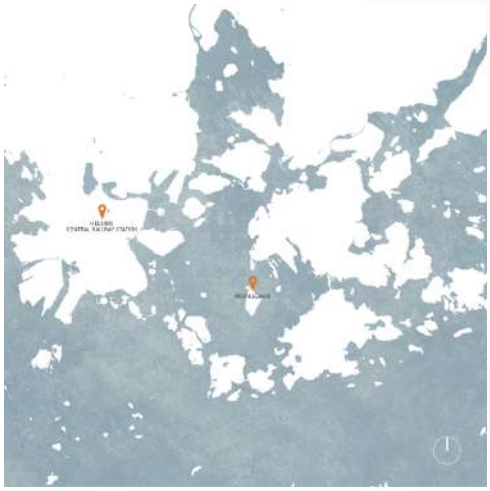
As the route continues to south, the next resting spot offers shelter in the form of a small hut. The walls on the hut are built of slats which creates a see-through surface. The main view inside the hut opens to Suomenlinna sea fortress. Behind the hut a rock wall rises up and forms a backdrop for the place. The most southern spot is a bench which duplicates the patterns of the surrounding bedrock. With small gestures, the bench invites users to stop and enjoy the view to the open ocean.

Nearby Suomenlinna sea fortress is an Unesco world heritage site. As Vasikkasaari is located in the visual landscape of the world heritage site, special attention is being paid on any new structures being build.

Keywords: Urban recreation, intelligent nature monitoring, sustainable traveling

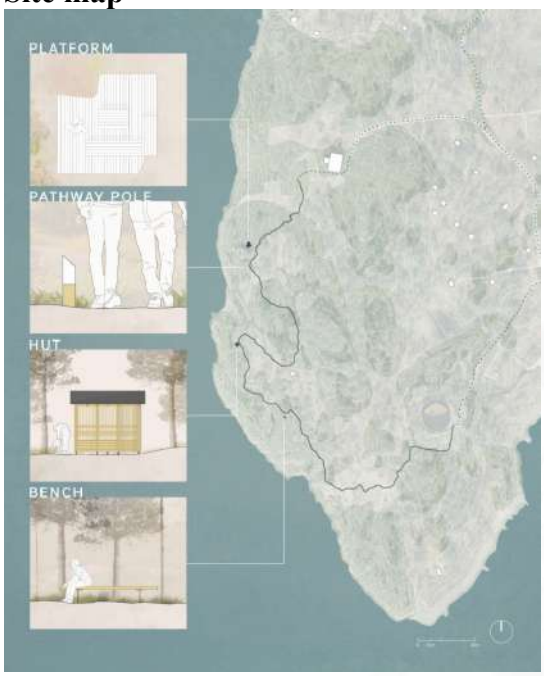
Hut by the path

Location



Military island landscape

Site map



Viewpoint to Helsinki city

Reviving Traditional Village Regulations for Environmental Sustainability in Chinese Villages

Yilei Wang, Chi Gao
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This paper examines the ecological wisdom embodied in traditional village regulations (乡规民约) in Southern China and their potential to aid modern rural environmental governance. Village regulations refer to public agreements collectively formulated by rural communities to govern themselves. Some regulations boast centuries of history and constitute important traditional ecological knowledge. The paper spotlights how such grassroots institutions, passed down generations and still actively used in China's countryside today, contain provisions that promoted sustainable behaviors. With immense environmental pressures threatening villages from the country's rapid economic expansion, analyzing the applicability of this ancestral custom to tackle current pollution, resource depletion and ecological challenges is valuable.

The background provided summarizes key scholarly debates on village regulations. While existing literature explores their general utility for rural governance, few works concentrate on their specific viability to meet pressing sustainability needs. Southern China is focused on as villages there face acute environmental strain from breakneck development, while preserving a rich lineage of diverse village rules with ample environment-related content to examine. Core research questions center on excavating ecological wisdom within traditional village regulations and assessing their modern relevancy.

Detailed analysis is provided on the embodiment of ecological knowledge in Southern village regulations. Namely, the understanding: 1) of environment and feng shui connections 2) of forests' water conservation capacities 3) that destroying vegetation damages farmland fertility and 4) overall demand for human-nature harmony. The paper argues such perspectives allowed rural communities to balance economic activities with environmental limits. Thus, despite lacking formalality, traditional regulations contain notions of sustainable development - harmonious human-nature relations enabling economic and social progress.

Multiple pathways to apply village regulations for modern environmental governance are proposed. Firstly, they provide historical basis to inform today's sustainability concepts and policies. Secondly, incorporating village regulations can enhance diverse co-governance - complementing top-down state laws with bottom-up participation. Thirdly, optimizing implementation and reducing management costs given the voluntary compliance mechanism based on rural custom.

In summary, the long lineage of village regulations in Southern China offers solutions to pressing ecological crises facing villages. Traditional ecological knowledge handed down generations shows sensibilities aligning with modern sustainability. Although informal, customary rules bring communities together; yield insights on human-nature balance; and foster participation - thereby holding promise to aid collective action on shared environmental

challenges. More research is merited, but the paper offers valuable conceptual foundation and practical guidance for adaptation.

Keywords: Chinese Village, Rural Sustainability, Village Regulations, Ecological Knowledge, Environmental Governance

Grassroots environmental movement for code red: Ovacık mining landscape

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Mining activities are humankind's domination of the landscape through extensive transformations. Affecting a thick section of the earth that occupies both atmospheric and subterranean environments, mining has devastating consequences on indigenous ecological systems. Ovacık village, once an ordinary rural settlement in Türkiye with fertile agricultural lands and orchards, has experienced dramatic spatial and sociocultural transformations with the arrival of a transnational gold mining company in the late 1980s. After the demolition of a particular segment of the settlement and the relocation of the cemetery, which are eradicative attempts against collective memory, mining, as well as physical and chemical processing of the ore have inflicted distinctive wounds upon the landscape. Also, immanation of the transnational company gave rise to the dissolution of social relationships within the local communities as the result of an intense polarization between the protagonist and the antagonist of the mine. Moreover, by producing bold borders around the mining site, a gated enclave has been formed within the village, reproducing the concept of private property.
Due to substantial landscape degradation and deep concern about the potential risks of gold processing, the local communities opposed mining activities in the village. The opposition, manifested itself in the legal arena first, resulted in a long-running grassroots environmental movement, marking the country's first instance of civil disobedience. Indeed, experiencing direct consequences of mining within daily life, such as contamination of tap water during the test drilling, was the reason that sustained the movement for years and kept the participants' tension always high. These occurrences prompted the inhabitants to realize that preservation of the living space and the local lifestyles can merely be achieved through the preservation of the landscape. Although the movement could not halt mining operations entirely, it compelled the company to make concessions and implement technological improvements in its operations. Moreover, it raised awareness across the country about environmental degradation and became a source of encouragement for other communities facing similar threats.
While the constituents of the movement acknowledged the landscape of Ovacık as a habitat, embodying not only humankind but also other life forms in a symbiotic relationship, the company perceived it as an instrument to generate surplus value, an inanimate raw material for capital accumulation. The same landscape was deemed as a source for economic growth and development by the Turkish government.
In this case, top-down actions tended to adhere to the confines outlined by neoliberal globalization, which prioritizes the market over anything, including the rights of human and non-human populations. In contrast, the bottom-up organization seemed to have the potential to stand for all living beings sharing the same landscape. Thus, mobilization of grassroots, who can grasp that their existence is inextricably linked to the coexistence of all other beings, appears critical in addressing environmental crises. Herein, besides mapping the devastated social, cultural, and natural landscape of Ovacık, this study advocates that the bottom-up organization of local communities is pivotal in the code red state that the earth is going through.

Keywords: mining landscape, grassroots environmental movement, environmental degradation

Characteristics of Home Horticultural Activities and Their Health Effects

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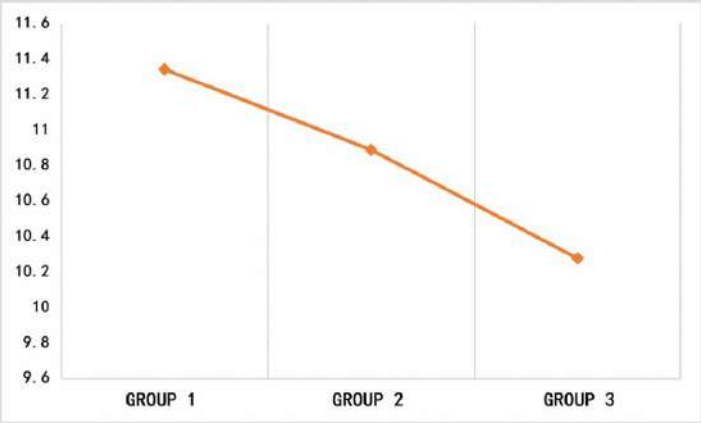
The rapid urbanization in China has had negative impacts on public health, and horticultural activities can play a positive role in improving public health. In recent years, there has been a growing trend of promoting physical and mental health through integrating natural physical activities into daily life. Home horticultural activities, which offer a sense of natural participation and closeness to daily life, are increasingly favored by urban residents. These activities are easier to initiate and maintain for city dwellers, and in high-density urban communities, they are more likely to spread, attracting more participants. This study focuses on communities in the old city of Beijing, China, with Dashilanr Street as the research subject. The 466 courtyards were investigated using questionnaires and the health status of 509 respondents was assessed using SF-36 and SCL-90. Descriptive statistics, Chi-square tests, and variance analysis were used to explore the characteristics of home horticultural activities and their impact on residents' physical and mental health.
The results indicate that: 1) The aging issue in old city communities is significant, and there is no clear difference in socio-economic characteristics between residents engaged in horticultural activities and those who are not; 2) Home horticultural activities in old city areas are characterized by short duration, high frequency, and low intensity, focusing mainly on planting potted plants and tending ornamental plants; 3) The lack of sufficient planting space is the primary reason residents give up home horticultural activities. Most residents choose to garden on the ground in courtyard spaces; 4) Residents engaged in home horticultural activities can alleviate anxiety to some extent, with the effect being enhanced with increased time and intensity of the activities. However, existing home horticultural activities currently have no significant impact on residents' physiological functions, energy levels, social functions, health changes, somatization, and other items. Finally, this study proposes four suggestions for promoting and implementing gardening activities among residents in the old city to improve health.

Keywords: public health, old city, home horticultural activities, health effect, landscape architecture

Average score of anxiety



Chi-square Tests

Item		Home horticultural activities			X^2	P
		Group1	Group2	Group3		
Gender	Male	85	95	12	1.772	0.412
	Female	132	171	13		
Age	<30	12	7	0	6.435	0.577
	30-45	28	34	1		
	46-60	52	72	7		
	61-75	96	109	12		
	>75	29	44	5		
Marital status	Unmarried	16	12	2	2.425	0.650
	Married	176	224	21		
	Other	25	30	2		
Education	Junior high school and below	102	127	10	0.923	0.988
	High school	83	96	11		
	junior college	17	23	2		
	Undergraduate university	15	20	2		
Occupation	Retiree	157	193	22	4.283	0.360
	Active personnel	32	41	3		
	Other	28	32	0		
Monthly income	<¥1000	14	18	1	1.435	0.964
	¥1000-¥3000	52	69	5		
	¥3000-¥5000	113	139	15		
	>¥5000	38	40	4		
Daily leisure time	<2h	33	22	1	12.031	0.051
	2-4h	28	33	2		
	4-6h	23	34	0		
	>6h	133	177	22		
Physical exercise	Yes	51	74	6	1.208	0.547
	No	166	192	19		

Demographic characteristics of respondents

Item		Engage in horticultural activities		Do not engage in horticultural activities		Total	
		Number	%	Number	%	Number	%
Age	<30	7	2.41%	12	5.53%	19	3.74%
	30-45	34	11.68%	29	13.36%	63	12.40%
	46-60	80	27.49%	51	23.50%	131	25.79%
	61-75	121	41.58%	96	44.24%	217	42.72%
	>75	49	16.84%	29	13.36%	78	15.35%
Gender	Male	107	36.77%	85	39.17%	192	37.80%
	Female	184	63.23%	132	60.83%	316	62.20%
Marital status	Unmarried	14	4.81%	16	7.37%	30	5.91%
	Married	245	84.19%	176	81.11%	421	82.87%
	Other	32	11.00%	25	11.52%	57	11.22%
Education	Junior high school and below	136	46.74%	103	47.47%	239	47.05%
	High school	108	37.11%	82	37.79%	190	37.40%
	Junior college	25	8.59%	17	7.83%	42	8.27%
	Undergraduate university	22	7.56%	15	6.91%	37	7.28%
Occupation	Retiree	216	74.23%	156	71.89%	372	73.23%
	Active personnel	44	15.12%	32	14.75%	76	14.96%
	Other	31	10.65%	29	13.36%	60	11.81%
Monthly income	<¥1000	18	6.19%	15	6.91%	33	6.50%
	¥1000-¥3000	74	25.43%	52	23.96%	126	24.80%
	¥3000-¥5000	155	53.26%	112	51.61%	267	52.56%
	>¥5000	44	15.12%	38	17.51%	82	16.14%
Daily leisure time	<2h	23	7.90%	33	15.21%	56	11.02%
	2-4h	35	12.03%	28	12.90%	63	12.40%
	4-6h	34	11.68%	23	10.60%	57	11.22%
	>6h	199	68.38%	133	61.29%	332	65.35%
Whether it is a permanent resident	Yes	285	97.94%	202	93.09%	487	95.87%
	No	6	2.06%	15	6.91%	21	4.13%
Total		291	100%	217	100%	508	100%

Multiple Comparisons

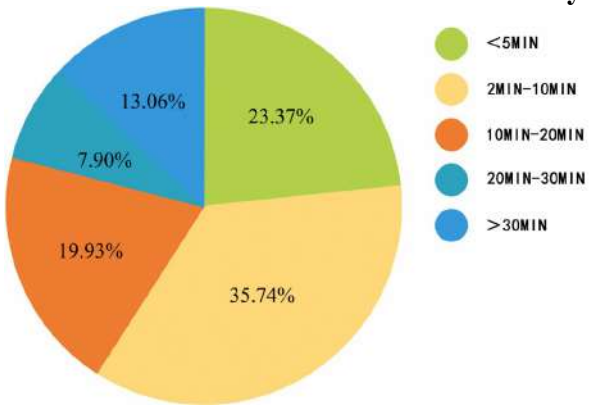
Dependent Variable	(I) group	(J) group	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
Physiological Functions	1	2	0.759	1.779	0.670	-2.736	4.253
		3	-2.519	4.107	0.540	-10.587	5.550
Energy Levels	1	2	-2.056	1.549	0.185	-5.099	0.987
		3	-7.603	3.576	0.034*	-14.629	-0.577
Social Functions	1	2	1.350	1.007	0.182	-0.630	3.320
		3	-2.920	2.324	0.210	-7.480	1.650
Health Changes	1	2	-2.970	3.297	0.369	-9.440	3.510
		3	2.660	7.612	0.727	-12.300	17.610
Somatization	1	2	-0.050	0.248	0.855	-0.530	0.440
		3	-0.040	0.573	0.948	-1.160	1.090
Anxiety	1	2	0.450	0.182	0.013*	0.100	0.810
		3	1.060	0.421	0.012*	0.230	1.890
Anxiety	2	3	0.610	0.417	0.146	-0.210	1.430
Other	1	2	-0.130	0.133	0.319	-0.390	0.130
		3	0.090	0.306	0.759	-0.510	0.700

Research area

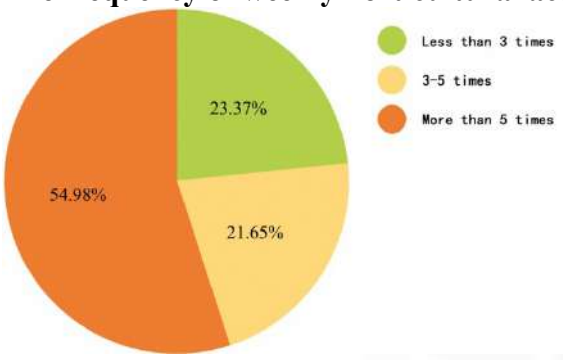
Test of Between-subjects Effects

Dependent Variable	Source	Type III Sum of Squares	*df*	Mean Square	*F*	Sig.
Physiological Functions	Corrected Model	273.751	2	136.876	0.362	0.696
	Intercept	1436638.51	1	1436639	3799.87	0
	Group	273.751	2	136.876	0.362	0.696
	Error	190928.217	505	378.076	–	–
	Total	4036950	508	–	–	–
	Corrected Total	191201.969	507	–	–	–
Energy Levels	Corrected Model	1500.388	2	750.194	2.617	0.074
	Intercept	1047140.71	1	1047141	3652.219	0
	Group	1500.388	2	750.194	2.617	0.074
	Error	144790.36	505	286.714	–	–
	Total	2871850	508	–	–	–
	Corrected Total	146290.748	507	–	–	–
Social Functions	Corrected Model	534.676	2	267.338	2.208	0.111
	Intercept	2751702.03	1	2751702	22723.83	0
	Group	534.676	2	267.338	2.208	0.111
	Error	61152.086	505	121.093	–	–
	Total	7440625	508	–	–	–
	Corrected Total	61686.762	507	–	–	–
Health Changes	Corrected Model	1488.52	2	744.26	0.573	0.564
	Intercept	406869.373	1	406869.4	313.208	0
	Group	1488.52	2	744.26	0.573	0.564
	Error	656015.171	505	1299.04	–	–
	Total	1831875	508	–	–	–
	Corrected Total	657503.691	507	–	–	–
Somatization	Corrected Model	0.249	2	0.125	0.017	0.983
	Intercept	32570.633	1	32570.63	4417.677	0
	Group	0.249	2	0.125	0.017	0.983
	Error	3723.262	505	7.373	–	–
	Total	92618	508	–	–	–
	Corrected Total	3723.512	507	–	–	–
Anxiety	Corrected Model	40.248	2	20.124	5.07	0.007*
	Intercept	21848.988	1	21848.99	5504.7	0
	Group	40.248	2	20.124	5.07	0.007
	Error	2004.422	505	3.969	–	–
	Total	64086	508	–	–	–
	Corrected Total	2044.669	507	–	–	–
Other	Corrected Model	2.754	2	1.377	0.655	0.52
	Intercept	11632.844	1	11632.84	5534.867	0
	Group	2.754	2	1.377	0.655	0.52
	Error	1061.378	505	2.102	–	–
	Total	33241	508	–	–	–
	Corrected Total	1064.132	507	–	–	–

The duration of each horticultural activity

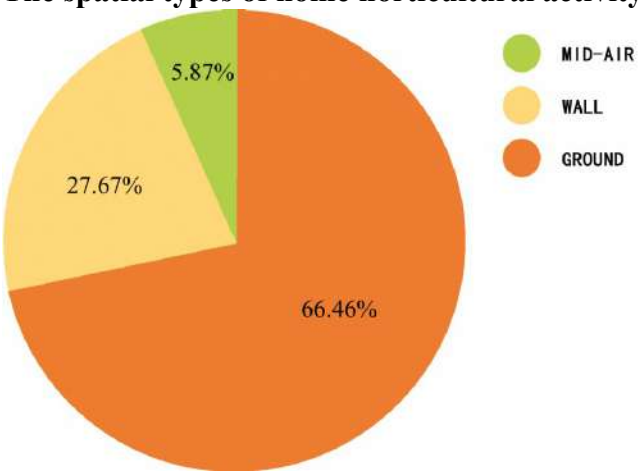


The frequency of weekly horticultural activity



The spatial types of home horticultural activity

The spatial types of home horticultural activity in courtyards



Spatial and Social Resilience in Crises: Migration Response to Disasters

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It is widely recognized that millions of individuals worldwide relocate either by choice or necessity each year. The reasons for forced migration can vary greatly, stemming from conflicts, oppression, political pressures, wars, poverty, and even natural disasters like floods and earthquakes. In the wake of such calamities, people seek to rebuild their lives by migrating to safe havens, either temporarily or permanently.

Over the past two decades, we've seen an unprecedented number of natural disasters occur in various countries around the globe. Research indicates that these events can trigger both domestic and international migration. However, history tells us that this phenomenon is not new and has been present since the dawn of civilization. Unfortunately, the movement of people following a catastrophic natural disaster can create challenges for both the areas they're leaving and the ones they're heading to. The regions left behind lose valuable human resources, which can impede economic recovery and contribute to population decline. Meanwhile, the destination areas may experience urban issues such as housing shortages, slums, and pollution, as well as disruptions to critical services like education, healthcare, security, and infrastructure.

The February 6, 2023 earthquakes centered in Kahramanmaras, Turkey had a significant impact on social life, resulting in forced migration and affecting 11 provinces including Kahramanmaras, Hatay, Gaziantep, Adana, Kilis, Osmaniye, Malatya, Elazıg, Sanliurfa, Diyarbakir, and Adiyaman. Several individuals were forced to relocate to safe provinces unaffected by the earthquake, with approximately 2.7 million displaced people. The migration movements and human trends after the earthquake were analyzed and compared to examples from world literature in a recent study. The study identified spatial problems in the places of migration and suggested solutions to provide spatial and social resilience for cities to minimize the consequences of these migration movements on urban systems.

Keywords: Spatial resilience, social resilience, migration, disasters, earthquake

From Power Lines to Green Lines

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Urban areas are dynamic environments shaped by the evolving needs of their inhabitants. Contemporary urban landscapes are complex amalgamations of various elements, each responding to the demands of the era and the growing requirements of cities. Among the critical needs in today's urban settings, energy stands out, with electrical power being an essential lifeline for urban functionality. Consequently, the proliferation of transmission towers, which facilitate the distribution and transmission of electrical energy, is becoming increasingly prevalent. However, these towers can have adverse effects on urban dwellers, presenting risks such as lightning strikes or accidents, particularly when situated within recreational green spaces or along pedestrian pathways. Such installations not only pose safety hazards but also detract from the aesthetic quality of the urban fabric.

In Bursa, Turkey, between the 29 Ekim and Altınşehir Neighborhoods, five significant transmission towers punctuate a 1.5 km stretch of open green space. Evaluating the function of these green areas reveals an opportunity to transform them into passive green areas while enhancing their aesthetic appeal through thoughtful design interventions. Through the analysis of the study, it was assessed that the spatial characteristics of the green areas housing these transmission towers, considering their dimensions in hectares and the intended functions outlined in zoning plans and were developed as appropriate landscape design suggestions for these areas.

The findings of the study showed that these five towers traverse approximately 7.5 hectares across 11 distinct green spaces. Four of these areas exhibit passive functions, while the remaining seven are designated for active recreational pursuits, including walking and other leisure activities. Additionally, one of these spaces serves as a children's playground.

To mitigate potential safety hazards and elevate the visual appeal of these passive green spaces, a comprehensive planting design strategy was proposed. By selecting plant species that thrive across the four seasons, a harmonious landscape was developed throughout the year, offering town-dwellers a sensory-rich experience while enhancing biodiversity and ecological resilience.

In conclusion, the suggestions of the study underscore the transformative potential of integrating landscape design principles within urban planning frameworks. By proposing transmission tower sites as vibrant green spaces, the study not only addresses safety concerns but also contributes to the development of sustainable, aesthetically pleasing environments that foster community well-being and connection with nature.

Keywords: Power lines, transmission towers, urban open and green areas, safety, aesthetic

Resilient Landscapes, Resilient Minds: Highlighting the Role of Perceived Oppressiveness

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Landscape architecture is one of the constructive aspects of cities that interacts with people daily. The result of this interaction forms the user's different perceptions. Each of the perceptual aspects causes an emotional and behavioral response for users. One of the less investigated dimensions is perceived oppression. Perceived oppression is a dominant type in urban environments, especially dense environments. This kind of perception causes double psychological pressure for users and will be a threat to mental health. Based on this, it seems necessary to identify the factors affecting perceived oppressiveness to prevent the creation of double mental pressure and the loss of mental health. In this way, by achieving mental health and achieving stability in society, a step towards resilience can be taken. Therefore, this article is written with the concern of identifying the role of landscape architecture in reducing perceived oppression. The purpose of this process is to achieve mental restoration in the direction of mental health and to reach a stable society. Based on this, social resilience is expected to occur through sustainability. Therefore, this article was written using qualitative research methods and content analysis. For this purpose, through documentary studies, sources with concerns about perceived oppression, sustainability, and mental restoration were examined. The results indicate that landscape architecture includes four dimensions, including biological, social and interactive, physical, management, and planning, to reduce perceived oppressiveness. The findings of this article can be practically used by city managers, landscape designers, and policymakers of landscape architecture to create a sustainable society through landscape architecture.

Keywords: Resiliency, perceived oppressiveness, sustainability, mental restoration

Bylaws Proposal for Multifunctional Rooftops of Istanbul

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Within the framework of C40 cities, local governments in some cities are collaborating on repurposing urban rooftops to create more resilient and climate-sensitive cities. Partnerships and regulations are established to achieve these goals. Roadmaps and incentives are continuously being developed to utilize underutilized city rooftops to address increasing needs such as food security, energy transition, rainwater harvesting, and creating social and active living spaces. Istanbul, as one of the C40 cities, requires a roadmap for repurposing rooftops to address these challenges. The city faces the reality of earthquakes, urban transformation, rising real estate prices, urbanization, difficulties in accessing healthy living spaces and nature, and internal migration due to income inequality. Utilizing all vacant spaces, including rooftops, through nature-based solutions (NBS) becomes essential in Istanbul, as well. Moreover, there are square kilometers of underutilized rooftop space in Istanbul, serving as a potential bridge between Europe and Asia. Through meta-data analysis, this article explores the regulations of cities such as New York, Berlin, Singapore, Toronto, and Rotterdam worldwide, which can guide Istanbul in becoming more resilient, climate-sensitive, and productive. Due to the multidisciplinary nature of rooftops, this article identifies opportunities and challenges in changing Istanbul's rooftop regulations through participatory methods. It analyzes the ecological perceptions and expectations of 24 different NGOs, social enterprises, and universities in Turkey regarding rooftops through focus group discussions. The article proposes sets of indicators and suggestions for regulations so that city rooftops can contribute to addressing climate change issues. In regions facing economic stress and stagnation, there are perceptions that greening the city is an economic burden, especially in the private sector. Additionally, concerns exist that inadequate climate-sensitive and resilient practices could lead to future problems requiring expensive public sector interventions. Grants and funds provided by city authorities, utility companies, and NGOs to address society's climate anxiety and increase the city's resilience are deemed insufficient to tackle these issues.
Although Istanbul is not among the leading cities globally in terms of productive rooftops, there are opportunities due to regulatory gaps regarding urban rooftops and spaces open to intervention. Financial resources are needed to raise public awareness, establish legal regulations, ensure safety and standards, and promote practices related to rooftops. A proposal for a "sustainability fund" has been developed for local and central governments as a financing source for NBS. The real estate sector, as a significant source of political financing in Turkey, can support the development of NBS on rooftops by contributing to the "sustainability fund" through incentives and regulations, thereby becoming a contributor to achieving "Partnerships for Goals," one of the sustainable development goals.

Keywords: Multifunctional rooftops, roofscape, bylaws, partnership for the goals, rooftop farm

Climate Justice Design for Resilient Community

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Climate justice at the local scale delves into the systemic vulnerabilities that communities face in dealing with climate change-induced hazards. It adopts an intersectional approach, integrating concepts of vulnerability, resilience, and sustainability (Cheng 2022). The spatial analytical framework of Climate Justicescape offers a comprehensive approach that integrates social, ecological, and technological systems to identify vulnerability hotspots and inform decision-makers to prioritize resources for climate justice and vulnerable communities and co-design solutions to enhance community resilience (Cheng, 2016; Cheng 2019). Climate Justice Design emerges as a proactive strategy aimed at redressing environmental inequities while enhancing community resilience in the face of climate change. It advocates for the co-design of Nature-based Solutions in collaboration with communities. Grounded in justice theory and community design principles, this research seeks to synergize theoretical insights with practical applications by embedding four dimensions of justice—procedural, distributive, restorative, and generational—within the co-design process with communities. Literature reviews and case studies in design education and practice underscores the importance of an interactive co-design approach. These studies reveal valuable lessons, particularly in recognizing and rectifying past injustices perpetuated by institutional systems within urban planning and design practices. Proposing a climate justice design framework, this research underscores the necessity of meaningful community engagement and governance embedded with justice principles. Such an inclusive and participatory approach is pivotal in steering sustainable development initiatives towards equitable outcomes. Climate Justice Design strives towards rectifying systemic injustices, transforming design practice, and ensuring that future investments in sustainable design practices contribute to, rather than exacerbate, existing disparities and injustice.

References:

Cheng, C. 2022. Chapter 4: Introduction to Section 1: Intersection between Systemic Vulnerability, Community Resilience, Climate Justice and Sustainability. In Yang, Y. and Taufen, A. eds, The Routledge Handbook of Sustainable Cities and Landscapes in the Pacific Rim. P39-47.

Cheng, C. 2019. Climate justicescape and implications for urban resilience in American cities, in M. A. Burayidi, et al. ed. The Routledge Handbook of Urban Resilience. Abingdon: Routledge

Cheng, C. 2016. Spatial climate justice and green infrastructure assessment: A case for the Huron River watershed, Michigan, USA. GI_Forum, Vol 1, 179-190.

Keywords: climate justice, climate justicescape, nature-based solutions, community design, systemic vulnerability

Designing cities for zoonotic resilience - A landscape oriented approach

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Humans coexistence with various species have always been prevalent for various causes since time immemorial. Yet today human – wildlife conflict has turned into a serious cause of concern which is not merely limited to the loss of human life but animals adapting extensively to urban environments (synurbanisation) and exhibiting urban traits; collectively termed as urban wildlife syndrome but also microbial transfer contributing to the emergence of numerous renowned plagues, epidemics and pandemics Almost 60 – 80% of the documented infections affecting mankind are of zoonotic or animal origin and this is slowly turning into a predominant cause of concern. Scientific deliberations however have always accounted the cause for the same around increased urbanisation, habitat fragmentation, biodiversity loss, agriculture etc. however very few studies actually have attempted to link them with the discipline of landscape architecture. Research done within the domain of veterinarian sciences, medical epidemiology etc. may have mentioned an occasional link here and there but nothing in depth or in a proper correlation as to what landscape architects can do to resolve this predicament.

This paper aims to understand what zoonoses is from the lens of landscape architecture and subsequently explore how the concept of zoonotic resiliency in today's cities may be achieved using landscape design. The outcome is prototypic design approach and framework that may be adapted into the landscape design of any urban ecosystem. Also a cemented understanding of the fact that landscape architecture is indeed capable of curbing zoonosis at the initial phases itself. In a post pandemic scenario that is seeing a gradual rise in the case of zoonotic infections, this knowledge holds extremely relevance if we are to prevent another zoonotic outbreak.

The paper also adopts a suggestive route towards the potential measures that maybe undertaken by landscape architects and urbanists towards urban zoonotic resiliency. Additionally, it also delves into the potential and necessity of reorienting existing development norms and frameworks towards developing zoonotically resilient cities in the face of climate change. A combination of design interventions, proactive planning upon consultation with experts from various fields and policy formulations is needed for success to prevail. Ennumerous ecosystems have crossed to a point of no return towards the ideal natural scenario. Significant alterations to the overall environmental ecology can have severe implications on the overall ecosystem dynamics which is only likely to exacerbate with climate change. Mimicking the natural environment to the best possible is the core strategy to keep zoonotic spill over at bay. Addressing each parameter individually is equally important and more successful rather than targeting random parameters for a holistic approach. Ecological interventions need to complement the conventional interventions for attaining higher success rates.

Keywords: Biodiversity, Healthy cities, Landscape architecture, Urbanization, Zoonoses

Code Red for Disaster Risk Reduction and Resilience

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In developing countries disaster management follows top-down and reactive approaches. This indicates that neither the government agencies which are responsible for the disaster management have tried to reduce the risks before, during, and after the disasters, nor have communities prepared on their own to reduce their risk through coping mechanisms. The contemporary literature argues that the elected government always seeks tangible interventions rather than investing in risk reduction. On the other hand, nongovernmental organizations face limitations on investment in risk reduction programs and strategies. Such assessments and analysis may make the regional policy makers and residents aware of adaptation mechanisms that can enhance and build resilience to cope with major disasters. Furthermore, preparedness methods need to be adapted in order to reduce the future damage from disasters and strengthen the preparedness activities and institutional mechanism that enhance the disaster risk reduction strategies in the local community.

The border objective of this project assesses the investment in disaster risk reduction for resilience which is a grey area in many developed and developing countries. While often murky, it is extremely important to reduce risk at the local level to achieve sustainable development. The specific objectives are as followings:
• To assess the investment in disaster risk reduction in the case of Thailand.
• To assess the urban resilience at local level for sustainable development.

The study is primarily exploratory and qualitative in nature. The Project will utilize secondary data and a literature review focusing the investments in Disaster Risk Reduction for resilience in Thailand. Case study design will be used in the project. The secondary data for the case studies will be collected through published materials and policy documents.

Keywords: Disaster Risk Reduction, Flood, Thailand, Resilience, Sustainable

Echoing radical traditions: rural E-commerce revolutions in Yellow River floodplain

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OBJECTIVES: Since the rise of e-commerce in China in the 2010s, there has been widespread interest in the phenomenon of the prosperity of manufacturing industries in traditional rural settlements under this new model of trans-regional sales. Taobao villages are prominent examples of such rural settlements, where members of rural communities have achieved a sort of "urbanisation" of their villages through intensive transactions with national customers on Taobao, China's largest e-commerce platform. This study sees Taobao villages as an illuminating example for investigating *planetary urbanisation*, especially for delving into the dimension of *plural temporality* that is not adequately articulated in this concept. The theory of planetary urbanisation emphasises that urbanisation under capitalism unfolds through intervention, emplacement and contextualisation in pre-existing and diverse historical-geographical conditions. From this foundation, this study argues that understanding and studying planetary urbanisation requires investigating the production of specific spatial-temporal *conjunctures* that point to the different dynamics of a given socio-spatial system, which intertwine and conjoin the given conditions that emerge within given times. This study sees Taobao Villages as typical conjunctures under planetary urbanisation, a kind of social landscape unit that mixes many contradictory features such as the urban/rural, post-/pre-modernity, and so on. This study seeks to illuminate a Taobao village as a moment that is a temporary interweaving and synchronisation of various nascent, ongoing or reactivated social relations and their conditions.
METHODS & RESULTS: After excluding Taobao villages in close proximity to large urban agglomerations to avoid economic radiation effects at the physical-geographical level, this study focuses on the "independent" Taobao villages. Through quantitative comparative analyses in GIS, this study finds a high degree of correlation between their geographic distribution patterns and a particularly important historical landscape: the Yellow River and its floodplain. Between the established research on Taobao villages and on the social-ecological history of the Yellow River floodplain area, the qualitative analyses in this study have identified a number of common features to support an explanation of this correlation. These features include five aspects that are historically embedded in the local ecology: flexible and dynamic forms of labour, delayed population agglomeration, high social mobility, entrepreneurial and speculative habits, and strong community ties.
DISCUSSIONS: The theory of planetary urbanisation effectively offers an explanation for this correlation: over eight hundreds years in the lower Yellow River, the frequent involvement of disasters associated with the hydrological system has constituted the region's unstable mode of production, and its many environmentally, socially, and politically persistent institutions, representations, strategies, and struggles are the key elements of the framing of these Taobao villages as conjunctures in planetary urbanisation. Based on this reading, this study proposes a complementary conceptualisation of planetary urbanisation as an interweaving process of plural temporalities, recognising the relative autonomy, contingency and incommensurability of the differential historical elements within it.

Keywords: Planetary Urbanisation, E-commerce, Yellow River Floodplain, Plural Temporalities, Rural Studies

Cultural Landscape of Italian inner areas to experiment sustainable development

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Although marginal villages and the inner rural and mountain areas are often plagued by problems that threaten the survival, they represent authentic reserves of ecological, environmental and cultural values consolidated in a very long co-evolutionary process.
In an age that questions the sustainability of traditional urban development models that show their inability to stem and repair the damage caused by past and ongoing environmental crises, the villages and rural territories of inner areas can face their impacts and represent uncommon places to promote innovative models based on the connection of human life with the landscape.
Tuscany is one of the Italian regions where people are concentrated in a few cities and territories, neglecting the small historical settlements in inner areas that often offer architectural, landscape and ethno-anthropological values of singular interest and beauty.
REACT research, conducted in an interdisciplinary way through collaboration with experts from four different disciplines (Architecture, Economics, Education and Engineering), aims to work on the specific cultural landscape of one of Tuscany's inner areas: the Casentino Valley, which will act as an incubator of ideas to experiment with new participatory research practices.
The research aims to define strategies and actions to generate ecologically, environmentally and economically sustainable and socially inclusive development processes based on local communities' active engagement and conscious participation.

More specifically, the research aims to achieve the following OBJECTIVES:
- Develop new models of architectural and landscape heritage planning and conservation by increasing biodiversity and reactivating ecological landscape patterns according to the European Green Deal and the latest models of ecological, digital and resilient development (NextGenerationEu)
- Provide tools for the implementation of urban and landscape planning with a focus on the issue of ecosystem services
- Developing new forms to enhance bio-cultural heritage based on typical eno-gastronomic and handicraft products and tourist services capable of retaining the added value of traditional knowledge and collective memory in the territory, increasing the employment opportunities for young people
- Shaping new inclusive housing models by identifying clean energy requalification strategies and experimenting with forms of governance capable of developing new models towards energy self-sufficiency on a local scale
- Improve accessibility to increase environmental health and well-being and promote social inclusion
- Identify, starting with the local economy, new models of regeneration centred on active and inclusive community participation and new models of public policy and governance
- View migrant inhabitants as a valuable resource for the host territory and the development of the native place
- Develop tools for building empowered communities in a continuing education process (Faro

convention).

The contribution will show the intermediate results of REACT research on inner areas. A multidisciplinary and transdisciplinary approach that, through the concept of cultural landscape, consolidates the different dimensions of the subject into a holistic view: tangible cultural heritage, local economy, and human and social resources.
In a strong cooperation with local actors, the theoretical-practical participatory model applied in Casentino aims to suggest strategies to promote sustainable development by regenerating local resources through community actions.

Keywords: Cultural Landscape, Sustainable Development, Participatory Research, Resilient community, Ecosystem services

REACT WEB SITE

https://www.react-casentino.unifi.it/

"Interaction of the Central Taurides cultural landscape and Sarıkeçili Yoruks"

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It offers crucial potential for examining the responses of local communities to the problems that have emerged due to the climate crisis in recent years and the reactions of the cultural landscape in which local communities interact with climate change. This study aims to reveal the interaction of nomadic communities with the cultural landscape and their relationship with climate. Sarıkeçili Yoruks living in the Central Taurus Mountains are an ancient nomadic community that survives by migrating according to the seasons. The community lives in the coastal regions where the climate is mild in the winter and earns their living by migrating to the plateaus in the spring to reach the pastures that provide the primary food for their goats. While they live in the plateaus with the "Black Tent" they produce from goat hair using traditional construction techniques, they live in winter dormitories in the forest, away from settlements. The existence of Sarıkeçili nomads in the Central Taurus Mountains and their relationship with the cultural landscape provide important data. Their life practices shape the cultural landscape. This continuous interaction ensures Sarıkeçili culture's continuity and the central Taurus's cultural landscape. These interactions with the cultural landscape provide examples and lessons in adapting to and mitigating the effects of changes caused by the climate crisis. Moreover, their ancient culture carries the duties undertaken by a community resistant to climate change in protecting the ecosystem from ancient times to the present day. In the study, local knowledge of nomadic culture and intangible elements such as nomadic culture, nature reading knowledge, and traditional ecological knowledge enables the detection of concrete elements such as black tents and sheepfolds and cultural landscape elements such as caves and agricultural terraces. Cultural maps:These are maps that can contain qualitative information as well as the quantitative meanings attached to a map.
Semi-structured interviews were conducted with ten families determined to create the cultural mapping. The migration routes of the interviewed nomads were determined spatially and mapped using geographical information systems.
It has been observed that the presence of Sarıkeçili nomads in the central Taurus region increases the diversity of plant species in the plateaus. It has been determined that the nomadic culture used rock cavities and archaeological sites, which are cultural landscape elements in the central Taurus Mountains. It has been learned that the presence of goats in the pine forest in their winter dormitories causes dry pine needles, which are very flammable, to become integrated with the soil. It has been shown that red pine forests, which are at risk of fire due to the climate crisis, reduce the risk of fire. It has been determined that the forest areas designated by nomads as winter dormitories due to forest policies are unaffected by fire.It has been understood that the cultural landscape in the Central Taurus Mountains is more resistant to the problems caused by the climate crisis with the help of the Sarıkeçili culture and that the existence of the culture is directly related to the cultural landscape.

Keywords: climate change, nomadic, cultural landscape, traditional knowledge

Increasing Ecological Resilience Through Climate Change Adaptation Studies in Mudanya/Bursa

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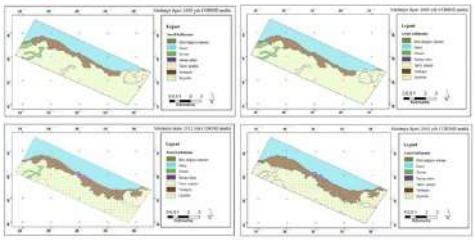
Cities are facing a range of problems due to climate change. Increasing frequency and severity of extreme weather events, rising sea levels, and temperature changes are some of these problems. These changes endanger the socioeconomic structure, as well as the plant and animal life of the region. Cities are developing resilience strategies and policies to adapt to climate change. In this context, environmental measures, including energy-efficient landscapes and sustainable designs, are being implemented to mitigate the negative effects of urban climate change. Cities are establishing green infrastructure systems to reduce climate change-related risks such as water management, flood control, and preservation of water resources. According to the NDVI analysis, CORINE maps, and other findings for Mudanya within this study, forests, and agricultural lands have decreased; some have been replaced by olive groves, while some forest and agricultural lands have begun to be used as residential areas. Floods have occurred in the region before, and no preventive measures have been taken, resulting in a still-high risk of flooding. Habitat fragmentation is excessive. Based on these findings, it has been mentioned that adaptation to climate change is necessary by emphasizing the use of native plants in landscaping. It is recommended to maintain habitat integrity through sustainable transportation and to adopt sustainable approaches in agriculture and water management. The recommendations provided encompass a multidimensional approach covering primarily ecological and environmental aspects, as well as social and economic dimensions. The goal is to increase the city's resilience, recovery, and adaptability to climate-related shocks and stresses. The social dimension emphasizes community engagement to ensure active participation in resilience-building efforts. The environmental dimension highlights the importance of preserving and restoring natural ecosystems such as wetlands and forests, increasing biodiversity, and providing resilience benefits by supporting environmentally friendly practices.

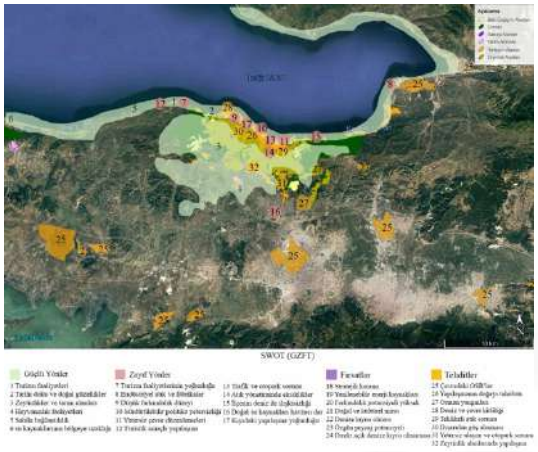
Keywords: Mudanya, Climate Change, Threats, Urban Resilience, Planting Design.

CORINE MAPS



CORINE Land cover of the study area (2000-2018)

Swot with Lands Use/ Land Cover



The alignment of land use and land cover analysis with SWOT analysis.

Landscape Architects: Superheroes of the 21st Century

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In the rapidly evolving urban and rural landscapes of the 21st century, landscape architects are emerging as unsung superheroes, using their expertise to address the challenges of climate change, urbanisation and environmental degradation. This paper explores the multifaceted role of landscape architects as designers, planners and stewards of the natural environment, showcasing their innovative approaches to creating sustainable, resilient and aesthetically pleasing spaces. Through case studies and examples, it highlights the transformative impact of landscape architecture in revitalising urban areas, conserving biodiversity and promoting human well-being. As society grapples with pressing environmental issues, landscape architects are at the forefront, using their skills to shape a greener, more vibrant future for generations to come.

This paper also explores the diverse skills of landscape architects, which include expertise in ecology, horticulture, urban planning and the social sciences. Their ability to integrate these disciplines enables them to tackle complex issues such as stormwater management, urban heat island mitigation and community engagement. By collaborating with stakeholders and using cutting-edge technologies, landscape architects demonstrate their ability to envision and implement transformative solutions that balance environmental sustainability with social equity.

In addition to their proactive approach to addressing today's challenges, landscape architects play a critical role in advocating for policy change and promoting public awareness of the importance of green infrastructure and public spaces. Through their advocacy efforts, they promote policies that prioritise nature-based solutions and advocate for equitable access to green spaces, particularly in underserved communities.

In conclusion, this paper highlights the indispensable role of landscape architects as superheroes of the 21st century, emphasising their ability to catalyse positive change in the built and natural environment. By harnessing their creativity, expertise and passion, landscape architects inspire hope for a more resilient, equitable and sustainable future.

Keywords: Sustainability, Resilience, Transformative Solution, Nature Based Approaches, Community Engagement

The 15-minute city: A framework for sustainable, liveable, healthy neighbourhoods

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The concept of the 15-minute city has emerged as a transformative framework for urban development, aiming to create more sustainable, liveable, and healthy neighbourhoods. This paper presents a comprehensive analysis of the 15-minute city model, exploring its potential to reshape urban landscapes into more human-centric environments. The primary objective of this study is to evaluate the effectiveness of the 15-minute city in promoting sustainable urban living, enhancing community well-being, and mitigating environmental impacts.

The methodology adopted for this research includes a mixed-methods approach, combining quantitative data analysis of urban metrics with qualitative assessments through case studies and scientific publications. The study focuses on several key dimensions of urban living, including accessibility, diversity, sustainability, and community resilience. By examining cities that have begun implementing the 15-minute city principles, this research identifies critical success factors and challenges encountered in the process.

Results from the study indicate that neighbourhoods designed around the 15-minute city concept exhibit significant improvements in residents' quality of life. These improvements include increased access to essential services and green spaces, reduced reliance on private vehicles, and enhanced opportunities for social interaction. Furthermore, the findings suggest that the 15-minute city framework can contribute to more resilient urban systems, capable of adapting to socio-economic and environmental changes.

The discussion section delves into the implications of these findings for urban planning and policy-making. It highlights the importance of integrated planning approaches that prioritize pedestrian-friendly infrastructure, mixed-use development, and community engagement. The paper also addresses potential barriers to implementing the 15-minute city model, such as existing urban form constraints and socio-economic disparities.

In conclusion, the 15-minute city presents a promising avenue for creating more sustainable, liveable, and healthy urban environments. However, its successful implementation requires a collaborative effort among planners, designers, policymakers, and communities. This study contributes to the growing body of literature on sustainable urban development and offers valuable insights for cities aiming to adopt the 15-minute city principles.

Keywords: 15-minute city, sustainable urban development, liveable neighbourhoods, healthy communities, urban resilience

Urban landscape co-design framework: linking participatory activities and landscape design

Julia Nerantzia Tzortzi
Julia Nerantzia Tzortzi

In the context of urban planning, participatory processes and co-design activities are considered to be extremely beneficial to both policymakers and engaged citizens, especially young people. On this paper are presenting HORIZON EUROPE projects that are aims to investigate the role and benefits of participatory processes and co-design activities for the regeneration of densely populated and urbanized metropolitan areas. The aim of the study is to combine general design criteria with co-design, working on the design of sustainable restorative open spaces on cities and pedestrian areas, based on the introduction of Nature-Based Solutions (NBS), while promoting different stakeholders Interdisciplinary collaborations between, for example, researchers, teachers and students, NGOs and institutional groups specializing in environmental and landscape architecture. The findings could provide an innovative example of how regenerative open green spaces can be designed and implemented, and the results of the participatory process can be used to evaluate the benefits of using these spaces to local residents, particularly young students and their families. It is proposed a co-design framework and suggest enabling collaboration at multiple levels during different design steps of the process. By analyzing public co-design processes in Piraeus, Greece from the perspective of our framework, it is highlight the diversity inherent in this approach.

Keywords: urban landscapes, public spaces, participatory activities, landscape design, co-design

Synecocultural forest: a resilient forest landscape in Isabela, Philippines

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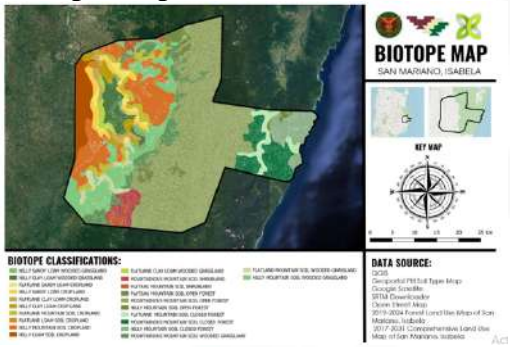
San Mariano, Isabela's Forests provides vital services to both the community and environment. However, they are threatened by unsustainable timber harvesting. To address this problem, the study introduces Community-based Forest Management Mapping as a tool for forest protection and conservation. In this method, biotope mapping was done to have a clearer understanding of the various ecosystems present in the study area. Then, a stakeholder consultation regarding the desired usage and protection strategy for each biotope was conducted. The results of the stakeholder consultation were synthesized and used to identify different forest management unit classifications for each biotope. To create the forest management unit map, the biotope map was used as a basis to form the areas for each identified classification. The forest management unit map created will help in identifying and delineating areas of forest that have similar characteristics and potential for management. Based on the analysis of the results, the researcher proposed an agroforestry development masterplan to address the problem regarding forest degradation. The proposed masterplan can be used as guide to foster a resilient ecosystem that supports the well-being of local communities while preserving the area's ecological integrity for present and future generations. Through active community involvement and collaboration, this study aims to empower local communities, promote sustainable resource management practices, and ensure the long-term viability of forest landscapes.

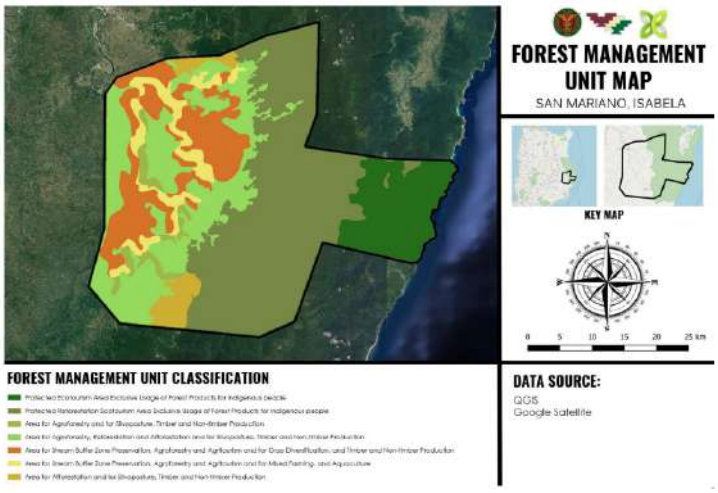
Keywords: Forest degradation, resilient community, forest conservation, agroforestry, sustainable development

Biotope Map



The figure shows the biotope map of San Mariano, Isabela. This process allows a clearer understanding of the various ecosystems present in the study area. The map was made by overlaying the landform map, landcover map, and soil type map of San Mariano, Isabela using QGIS.

Forest Management Unit Map



The figure shows the forest management unit map of San Mariano, Isabela made using QGIS and Microsoft Power Point. Forest management unit mapping was used as a method to identify and delineate areas of forest that have similar characteristics and potential for management based on stakeholder's desired usage and desired protection strategy for each biotope.

ORAL PRESENTATIONS

Acting for All: Diversity, Equity & Inclusion

Comparing Performances across State-led, Co-managed, and Community-based Conservation in China

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[Objective] Against the backdrop of the mass species extinction criss, the ecosystems on which humans and other species depend are being degraded at an unprecedented rate. The establishment and management of protected areas (PAs) are crucial to safeguard global biodiversity. However, the intensified conflicts between PA authorities and neighboring communities may reduce the conservation effectiveness. Despite the global attention paid to evaluating community governance effectiveness in PAs, very few researches have statistically compared the performance amongst diverse community governance models. [Methodology] Based on the Institutional Analysis and Development (IAD) framework, this study selects 17 typical communities in and adjacent to the Giant Panda National Park in China. By conducting questionnaire surveys, semi-structured interviews, one-way ANOVA, and step-by-step regression analysis, we compares across three different community governance types of state-led, co-managed, and community-based conservation in terms of their perceived ecological, economic, and social performance. [Results] Results show that: 1) local communities are more likely to develop positive conservation performance compared to socioeconomic performances; 2) the community-based conservation has achieved the highest scores across three aspects, and state-led conservation outweighs the co-managment regime in ecological and social dimensions; and 3) local perceptions towards PAs may be also affected by village location, community size, individuals' demographic features and other factors. [Conclusion] The study points out that each community governance type has its own advantages and disadvantages, and even the best-performed community-based conservation model cannot serve as a "panacea" for governing all PA communities for its potential instability, injustice, and inefficiency. This study makes the first attempt to compare across different community governance types under the IAD framework and provides practical management suggestions for PA authorities so as to better coordinate between biodiversity conservation and local sustainable development.

Keywords: national parks, community-based conservation, local communities, perceptions, sustainable development.

Fig. 1 IAD Framework of Community Governance in PAs

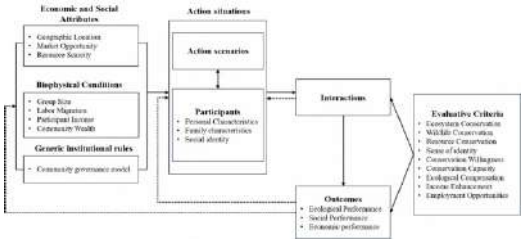

Fig. 2 Study area and sampling sites

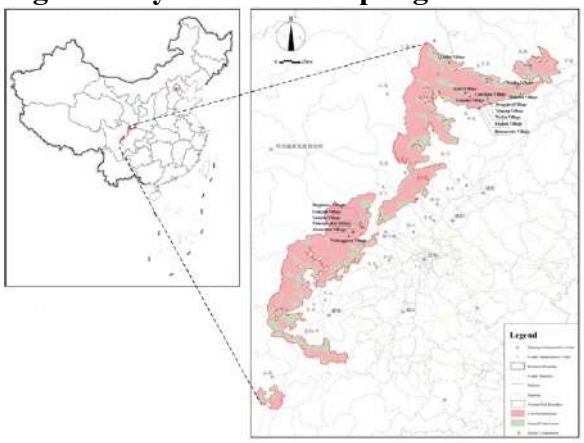

Fig. 3 Stacked bar chart of perceived performance frequency of households in Giant Panda National Park (n=560)

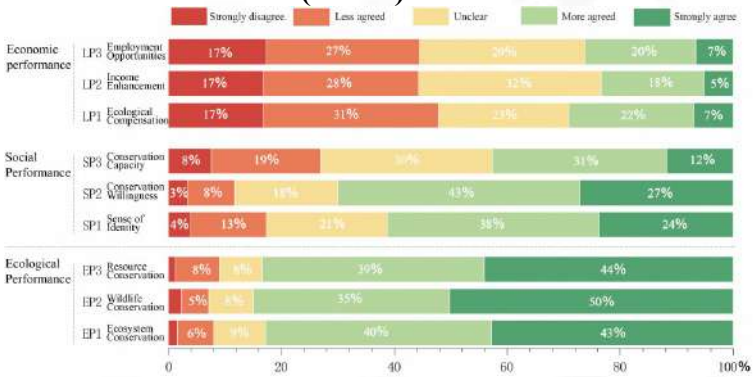

Fig. 4 Comparison of Perceived Performance under Different Governance Models in Giant Panda National Park

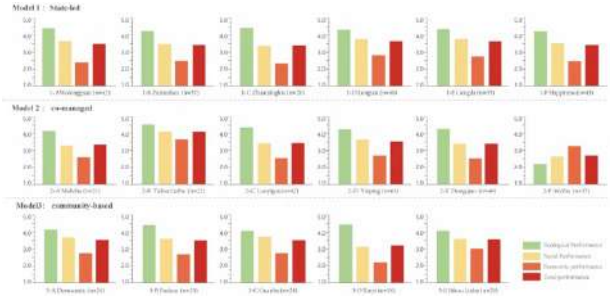

Table 1 Variable screening based on the IAD framework

Variable Type	Variable Code	Variable Name	Variable Definition	Data Source
Generic institutional rules	GT	Community governance model	State-led = 1, co-managed = 2, and community-based= 3	Interview
Biophysical Conditions	PG1	Geographic Location	Spatial location: outside PA= 1, partially inside PA= 2, inside PA = 3	Interview
	PG2	Market Opportunity	Proximity of village councils to major commercial centers (km): <30=3, 30-60=2, >60=1	Cartographic surveys
Economic and Social Attributes	ES1	Group Size	Total registered population of administrative villages (persons): <500=1, 500-1000=2, >1000=3	Interview
	ES2	Labor Migration	Proportion of population in the community moving to urban areas (%): <30=1, 30-60=2, >60=3	Interview
	ES3	Participant Income	Average annual income level of villagers in 2022 (thousand RMB) (<10=1, 10-15=2, >15=3)	Interview
	ES4	Community Wealth	Total collective economy of administrative villages	Interview

			(million) (<30=1, 30-60=2, >60=3)	
Demographic Characteristics-Participant Characteristics	PC1	Gender	Male = 1, Female = 2	Questionnaire
	PC2	Ethnicity	Han = 1, Tibetan = 2, Qiang = 3, Other = 4	Questionnaire
	PC3	Age	less than 20 = 1, 21-30 = 2, 31-40 = 3, 41-50 = 4, 51-60 = 5, over 61 = 6	Questionnaire
	PC4	Education	None = 1, Elementary School = 2, Middle School = 3, High School/Middle School/Vocational High School = 4, Bachelor's Degree/College = 5, Master's Degree and above = 6	Questionnaire
Demographic Characteristics-Family Characteristics	FC1	Family residence duration	0-5 years = 1, 5-10 years = 2, 10-20 years = 3, over 20 years = 4	Questionnaire
	FC2	Family size	Total household size (persons)	Questionnaire
	FC3	Family annual income	less than 10000=1, between 10000 and 30000=2, between 30000 and 50000=3, between 50000 and 70000=4, between 70000 and 100000=5, between 100000 and 200000=6, and above 200000=7	Questionnaire
Demographic Characteristics-Social Identity	SC1	Forest ranger	Yes = 1, No = 2	Questionnaire
	SC2	Village leader	Yes = 1, No = 2	Questionnaire

Performance Evaluation-Ecological Performance	EP1	Ecosystem Conservation	Strongly disagree; = 1; Somewhat disagree; = 2; Hard to say = 3; Somewhat agree = 4; Strongly agree= 5	Questionnaire
	EP2	Wildlife Conservation	Strongly disagree; = 1; Somewhat disagree; = 2; Hard to say = 3; Somewhat agree = 4; Strongly agree= 5	Questionnaire
	EP3	Resource Conservation	Strongly disagree; = 1; Somewhat disagree; = 2; Hard to say = 3; Somewhat agree = 4; Strongly agree= 5	Questionnaire
Performance Evaluation-Social Performance	SP1	Sense of identity	Strongly disagree; = 1; Somewhat disagree; = 2; Hard to say = 3; Somewhat agree = 4; Strongly agree= 5	Questionnaire
	SP2	Conservation Willingness	Strongly disagree; = 1; Somewhat disagree; = 2; Hard to say = 3; Somewhat agree = 4; Strongly agree= 5	Questionnaire
	SP3	Conservation Capacity	Strongly disagree; = 1; Somewhat disagree; = 2; Hard to say = 3; Somewhat agree = 4; Strongly agree= 5	Questionnaire
Performance Evaluation-Economic Performance	LP1	Ecological Compensation	Strongly disagree; = 1; Somewhat disagree; = 2; Hard to say = 3; Somewhat agree = 4; Strongly agree= 5	Questionnaire
	LP2	Income Enhancement	Strongly disagree; = 1; Somewhat disagree; = 2; Hard to say = 3; Somewhat agree = 4; Strongly agree= 5	Questionnaire
	LP3	Employment Opportunities	Strongly disagree; = 1; Somewhat disagree; = 2; Hard to say = 3; Somewhat agree = 4; Strongly agree= 5	Questionnaire
/	/	/	/	/
/	/	/	/	/

Table 2 Basic Information of Sampled Communities in Giant Panda National Park

Community Governance Model	District	Township	Village Code	Village Name	Number of Households	Spatial location
State-led	Aba (Ngawa) Tibetan and Qiang Autonomous Prefecture	Wolong Town	1-A	Wolongguan	300	Partially Inside
State-led	Aba (Ngawa) Tibetan and Qiang Autonomous Prefecture	Wolong Town	1-B	Zumushan	354	Partially Inside
State-led	Aba (Ngawa) Tibetan and Qiang Autonomous Prefecture	Wolong Town	1-C	Zhuanjinglou	107	Partially Inside
State-led	Aba (Ngawa) Tibetan and Qiang Autonomous Prefecture	Gengda Town	1-D	Longtan	222	Partially Inside
State-led	Aba (Ngawa) Tibetan and Qiang Autonomous Prefecture	Gengda Town	1-E	Gengda	199	Partially Inside
State-led	Aba (Ngawa) Tibetan and Qiang Autonomous Prefecture	Gengda Town	1-F	Happiness	325	Partially Inside（Gateway community）

Co-managed	Wenxian County	Bikou Town	2-A	Moheba	167	Inside
Co-managed	Wenxian County	Tielou Zang Autonomous Township	2-B	Liziba	205	Inside
Co-managed	Qingchuan County	Qingxi Town	2-C	Luoyigou	470	Inside
Co-managed	Qingchuan County	Qingxi Town	2-D	Yinping	642	Adjacent （Gateway community）
Co-managed	Qingchuan County	Qingxi Town	2-E	Dongqiao	445	Adjacent
Co-managed	Qingchuan County	Qingxi Town	2-F	Weiba	318	Adjacent
Community-based	Pingwu County	Gaocun Township	3-A	Democratic	282	Partially Inside（Gateway community）
Community-based	Pingwu County	Gaocun Township	3-B	Fushou	173	Adjacent
Community-based	Pingwu County	Mupi Tibetan Township	3-C	Guanba	128	Partially Inside（Gateway community）
Community-based	Pingwu County	Muzuo Tibetan Township	3-D	Xinyi	105	Partially Inside
Community-based	Wenxian County	Bikou Town	3-E	Liziba	208	Inside

Table 3 Results of Multiple Comparison Analysis

Dependent Variable	(I) Governance model	(J) Governance model	Mean Difference (I-J)	Standard Error	Significance
Ecological Performance	State-led	co-managed	0.389*	0.083	0.000
	State-led	community-based	-0.122	0.099	0.220
	co-managed	State-led	-0.389*	0.083	0.000
	co-managed	community-based	-0.511*	0.099	0.000
	community-based	State-led	0.122	0.099	0.220
	community-based	co-managed	0.511*	0.099	0.000
Social Performance	State-led	co-managed	0.202*	0.081	0.012
	State-led	community-based	-0.168	0.097	0.083
	co-managed	State-led	-.202*	0.081	0.012
	co-managed	community-based	-.0370*	0.096	0.000
	community-based	State-led	0.168	0.097	0.083
	community-based	co-managed	0.370*	0.096	0.000
Economic performance	State-led	co-managed	-0.253*	0.091	0.006
	State-led	community-based	-0.280*	0.109	0.011
	co-managed	State-led	0.253*	0.091	0.006
	co-managed	community-based	-0.027	0.109	0.807
	community-based	State-led	0.280*	0.109	0.011

	community-based	co-managed	0.027	0.109	0.807
Total performance	State-led	co-managed	0.113	0.062	0.069
	State-led	community-based	-0.190*	0.074	0.011
	co-managed	State-led	-0.113	0.062	0.069
	co-managed	community-based	-0.303*	0.074	0.000
	community-based	State-led	0.190*	0.074	0.011
	community-based	co-managed	0.303*	0.074	0.000

*level of significance : * = p < 0.05, ** = p < 0.01, *** = p < 0.001)*

Table 4 Results of Stepwise Regression Analysis

Variable Type	Variable Name	Estimate	t value	Pr(>|t|)
/	/	3.18366	<	2.00E-16
Generic Institutional rules	Community governance model	0.27299	0.00289	**
Biophysical Conditions	Geographic Location	0.1977	4.04E-05	***
Biophysical Conditions	Market opportunity	-0.26674	0.009055	**
Economic and Social Attributes	Group Size	-0.08998	0.039887	*
Economic and Social Attributes	Participant Income	0.17592	0.018259	*
Economic and Social Attributes	Community Wealth	-0.15631	0.000908	***
Demographic characteristics	Education	0.04696	0.040411	*
Demographic characteristics	Family annual income	0.09723	6.55E-07	***
Demographic characteristics	Forest ranger	0.53584	9.35E-05	***

*level of significance : * = $p < 0.05$, ** = $p < 0.01$, *** = $p < 0.001$) Note: Only the variables that are significant as shown by the stepwise regression are shown in the table.*

Table 5 Analysis of the strengths and weaknesses of three community governance models

Community governance model	Subjects and content of governance	Advantages	Disadvantages
Community-based	PA authorities, local governments, NGOs, and communities work together to coordinate between conservation and development.	Rich forms of participation; The best ecological, social and economic outcomes	High investment and time costs; Higher volatility (triggered by policy, personnel changes); Risk of elite capture
Community-based Co-managed	PA authorities are in charge of conservation and local governments are in charge of development.	PA authorities and local governments are able to work together; Excellent economic outcomes	Wide variation in conservation effectiveness (it is difficult to ensure ecological effectiveness when PA authorities is weak); Lack of clarity of authority and responsibility between PA authorities and local governments
State-led	PA authorities in charge of protection and development	Maximum conservation efforts; Excellent ecological and social effectiveness	Fewer sources of funding and projects; Conflicting conservation and community development; Poor economic effectiveness

Heritage Interpretation System and Multi-dimensional Cognition by Landscape Anthropology

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Southeast University

In the era of public empowerment, heritage interpretation has become an important link in the protection and utilization of cultural heritage, and an important way for landscape heritage to serve the public. Currently, the recognition and practice of heritage in the academic world is mainly based on the trinity framework of "global-national-local". The knowledge and provisions of international organizations on heritage belong to the superlative embodiment of globalization; the knowledge of heritage with the nation-state as the basic unit belongs to the high-level embodiment; and for the creators, users and inheritors of heritage, the core values formed by them are the native embodiment of heritage. As a way of heritage existence, cultural heritage interpretation is not only a comprehensive and open process, but also a kind of public behavior, which requires not only the participation of multiple disciplines, but also the participation of multiple subjects in heritage interpretation activities. Therefore, the public's perception of heritage in this perspective is particularly important.
The article points out that, as a "garden-community complex" with diversified attributes, the research of Suzhou Gardens has remained at the supra-high level, which lacks the systematic thinking of the local perspective, and the bottom-up thinking from the perspective of the community plays an important role in the interpretation of the heritage of Suzhou Gardens. In this context, the article takes Suzhou Garden as the research object and summarizes the current status of top-down research on the heritage cognition of Suzhou Garden under the perspective of supersession and elevation. Based on this foundation, the article develops bottom-up research on native heritage perception from the following two aspects: 1) With the help of digital technologies such as semantic analysis and geographic information coupling technology, the article divides the system of Suzhou Gardens from the perspective of native tourists by utilizing the indicators of agglomeration, centrality, and core and edge characteristics, and classifies the attractions that are strongly perceived by tourists, moderately perceived by tourists and weakly perceived by tourists into three categories, namely, the core, transition, and edge, respectively. (2) Visiting the field research from the perspective of local residents and analyzing the formation of local interpretation and secondary classification to form a bottom-up interpretation of heritage. The study constructs a two-way heritage interpretation system and explores the interrelationships through the quantitative research of digital technology and the qualitative analysis of field research. The study finds that there is a dissimilarity between the living space and the tourist space of Suzhou Garden, and that the interaction between the top-down heritage cognitive system and the bottom-up community influence mechanism enriches the deeper interpretation of Suzhou Garden's heritage.
By exploring the relationship between the top-down and bottom-up dual cognitive systems, the article gradually clarifies the mutual influence of landscape heritage and community, and improves the three-dimensional image of Suzhou Garden's heritage and the landscape heritage interpretation system, which is an important reference for the public protection and utilization of landscape heritage in the interpretation of heritage.

Keywords: heritage interpretation,heritage communities,Suzhou gardens,digital technologies,landscape equity

The one-meter socialization for children in parks

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With the development of society, children's increasing demand for natural activities and outdoor socialization in parks is becoming more and more prominent, especially in the context of the construction of child-friendly cities, the renewal planning of all kinds of urban parks is facing new opportunities and challenges.

This study focuses on children's socialization in Shaping Park in Chongqing, exploring how to promote children's social interaction in urban parks based on children's needs for activities and spaces at different ages. The study utilizes field research and semi-structured interviews to summarize the current situation and potential needs of children's social interaction in Shaping Park from a child-friendly perspective, and to provide a basis for subsequent renewal planning.

Based on the final results of the research, the study establishes a child-friendly social system of "one meter socialization", which includes "one meter world", "one meter game", "one meter creativity", "one meter game", and "one meter game", "One meter of creativity", "one meter of volunteer", "one meter of integration" three aspects of the park children's social promotion strategy.

（1）Based on the "one-meter world". Implanting a one-meter-high enjoyable point, line and surface space in the park renewal to create an activity area exclusively for children, which can include children's mixed-age socialization, nature education, competitive sports, exploratory experience, composite activities and other functional needs, and provide material and spatial support for children's socialization.
（2）Create a "one-meter game". Add a children's game corner in the park, provide colorful interactive games, especially projects that require teamwork, and set up some small competitions to encourage cooperation and communication between children, while cultivating their social skills, teamwork and leadership.
（3） Stimulate "one-meter creativity". Add inspiring creative facilities, such as DIY workshops, interactive art walls, small musical instruments, children's creative exhibitions, etc., and provide painting, handmade, sculpture and other art materials and tools, so as to stimulate children's creativity and imagination, enhance their ability to express themselves, and promote creative exchanges among children. The program also promotes creative exchanges among children.
（4）Establishment of "One Meter Volunteer". Set up a training base for children's volunteers to stimulate children's enthusiasm to participate in social welfare activities, such as voluntary cleaning, accompanying widows and orphans, education on garbage classification, publicizing green travel, and planting trees, etc., to cultivate children's spirit of dedication and sense of teamwork, and to promote exchanges and cooperation among them in volunteer service. Promote the exchange and cooperation of volunteer service among them.
（5） Promote "one-meter communion". To create a social atmosphere of tolerance and communion, and to promote interaction and communication among children of different ages

and backgrounds. Children can learn to respect and understand others, as well as develop the qualities of friendliness and cooperation by organizing multicultural activities, group games and cooperative projects.

Keywords: One-meter socialization, Child-friendly, Urban Park renovation, Shaping Park

Interdisciplinary Framework: Integrating and Landscaping Urban Infrastructure and Public Space

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[Objective] Amidst China's urban development, transitioning from an incremental growth model to a focus on stock development and shifting from an economically centered approach to embracing ecological and cultural orientations, this study aims to dissect the transformation of urban infrastructure. It seeks to elucidate the interdisciplinary framework between infrastructure and public space, endeavoring to unearth the overlooked potentials of urban infrastructure. The research is dedicated to exploring how urban infrastructure can elevate the efficiency of urban land use, diversify public spaces, enhance environmental quality, and foster sustainable development practices.
[Methods] Firstly, the study introduces the concept of "Field Infrastructure," which is rooted in sociological "Field Theory" and harmonized with the Landscape Urbanism perspective that views the landscape as a novel model of infrastructure. Secondly, it embarks on a methodological pathway that includes developing a typology to categorize transformations of urban infrastructure into public spaces. This process also involves summarizing criteria for their systematic evaluation to construct a comprehensive inventory base. Thirdly, by delving into in-depth case studies of representative projects, the research aims to innovate mechanisms and design methodologies that significantly influence the regenerative design of urban infrastructures. Integrating practical experience with the Research through Design (RtD) methodology, the study utilizes a wide array of urban infrastructure and public space design cases in China. This multifaceted approach is dedicated to uncovering both innovative and pragmatic strategies and methods with broad applicability.
[Results] The research systematically investigates the coupling mechanism between infrastructure and public space, culminating in the establishment of a theoretical framework for "Field Infrastructure." This framework is built upon the re-conceptualization of infrastructure's multifaceted values, spotlighting its role in physical space, social culture, policy and regulatory, stakeholder participation, and engineering technology. It underscores the integrated, collaborative, pluralistic, and dynamic essence of these interactions. Additionally, the study outlines a transformative pathway for urban infrastructure, spotlighting innovative mechanisms and introducing a new paradigm for urban regeneration.
[Conclusion] By adopting an interdisciplinary lens and embracing a comprehensive environmental perspective, this study constructs a theoretical and practical framework that bridges diverse professional fields, including landscape architecture, urban planning, architecture, engineering, and urban design. It charts a forward-looking direction for infrastructure development, advocating for the symbiotic integration of urban infrastructure and public spaces. This approach, promoting an evolutionary infrastructure-oriented urban space creation, signifies a paradigm shift in the research of landscape architecture planning and design. Furthermore, it offers fresh perspectives for the understanding and integration of urban infrastructure with public space, contributing novel insights to the field.

Keywords: urban infrastructure, interdisciplinary framework, public space, field theory, paradigm shift

Design that integrates landscape, architecture and municipal engineering

Exemplary case study

Field Infrastructure

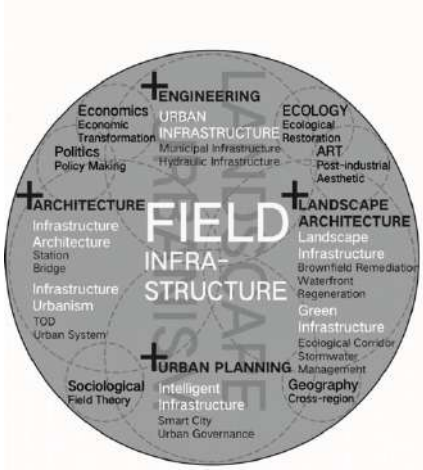

Diagram for research topics

Transformation of industrial remaining facilities into new urban public spaces

Exemplary case study

From Hidden to popular: brownfield landscapes as "Internet celebrity"

Jiechen Liu[1], Xiaodi Zheng[2]
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Brownfield landscape is a broad concept that includes abandoned mines, industrial art districts, railroad parks, etc. These sites are hard to be accessed by the general public before transformation due to the requirements of industrial production, or just remoteness of location. Due to extensive transformation practices, brownfield landscapes have become popular spaces with certain heritage values and even turned into an "Internet celebrity" phenomenon in China. These places are transformed from derelict sites to tour destinations. This study aims to explore the possibilities of brownfield landscape transformation and regeneration under multiculturalism from the perspective of users, to understand the social life under the new living concepts and the corresponding demand for public urban spaces, and to provide lessons for the renewal of this type of sites. Through case studies and comparative research, the study attempts to categorize and summarize the existing development paths of "Internet celebrity" brownfield landscape projects in China, then analyzes and discusses the reasons for the "Internet celebrity" phenomenon. Exemplary projects that are widely popular among the Chinese public are selected to conduct comparative study, including Shougang Park, Kingway Brewery, Nanjing Garden Expo, and Shenzhen O-power Amusement Park, etc. The selection of the cases is not dependent on the pioneering level in the profession but rather emphasizes the projects' ratings and popularity on China's public review platforms, such as Dianping APP, etc. This study summarizes three development paths of "Internet celebrity" brownfield landscapes in China: 1) Economy-oriented. Revitalizing heritage space by introducing cultural and art industries; 2) Event-based. Such as Kingway Brewery which hosts influential exhibitions; 3) Thematic. Capitalizing on the visual qualities of these sites and even creating urban amusement parks. Different from normal landscapes, brownfield landscapes have shaped a new aesthetic paradigm. At the same time, the development of media technology promotes the dissemination of images. Besides, in a consumer society, the demand for niche tours and "Theming" is growing. Starting from the phenomenon of "Internet celebrity" and the users' perspective, this study summarizes the development path of "Internet celebrity" brownfield landscape projects through comparative case studies and analyzes the reasons behind this phenomenon. The insights and discussions in this study contribute to the design and management of brownfield landscapes that simultaneously meet new living concepts and pass on the site's industrial memory in China.

Keywords: Brownfield regeneration, Internet celebrity, Development paths, China

Research on street environment behavior and perception in public community

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[Background] Environmental crisis, population flow, neighborhood combing and other phenomena catalyze the environmental disorder, and instability of public space elements, which aggravate public space environment and social inequality. With the accelerated land-expansion, social transformation and rapid development of urban agglomerations, the marginal space of urban and rural areas is expanding, and its publicity and governance are often accompanied by the pursuit of high-speed development while ignoring the fine management, and there is a contradiction between development needs and humanistic perception needs. With social and economic development, the adequate lighting, full coverage of monitoring-net and so on have realized the social security equality. The requirement of public environment has shifted from factual safety to perceived safety.

[Objective] Street public space is the main place for residents' daily outdoor activities. Safe-perceived space promotes residents' communication and public space utilization, thereby enhancing residents' sense of belonging and happiness. This paper quantitatively analyzes the relationship between objective spatial attributes and subjective safety perception at macro and micro scales, hoping to enhance environmental safety perception equality through landscape design.

[Methods] The research object is Fengtai District of Beijing, which is located at the junction of built-up area and non-built-up area. (1) Based on POI data, this study extracted 6 items of urban functional space layout, combined with the distribution of security risk cases from 2016 to 2022, and used Arcgis to conduct a comprehensive pre-analysis of the space safety attributes from a macro perspective. Based on the public-insecurity-perception-coefficient, the paper evaluates the urban macro insecurity-risk layout, and analyzes the relationship between urban functional spatial layout and insecurity-risk distribution. Simultaneously, the study selects Fangzhuang block in the core insecurity-risk area for the micro-spatial analysis; (2) The study used Depth-map to extract the block representative space, quantified the spatial structure by parameter indicators, and classified each parameter of the 25 street spaces into 1-5 levels of psychological security perception. (3) 188 valid questionnaire data were analyzed to quantify the relationship between safety perception and spatial structure features with a mathematical method. Finally, the influence of spatial location attribute, shape attribute, atmosphere attribute and other related indicators on macro security attribute and micro security perception of public space is determined.

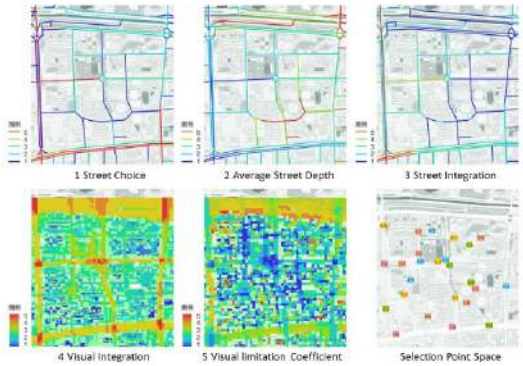
[Results] The results showed that (1) the distribution of unsafe-risks was in a ring structure, radiating from densely populated areas and functional areas to the periphery; (2) It has the most significant correlation with the edge degree; (3) The change of the shape and atmosphere attribute of the space can reduce the insecurity-risk. (4) Clarify the correlation and influence of five major spatial parameters that affect subjective safety perception.

[Discussion] Through a comprehensive study of the perception-environment interaction

process, we propose a bidirectional dynamic promotion mechanism to strengthen space safety equality, reduce insecurity risks, promote public participation and enhance safety perception, strengthen the virtuous cycle, and propose relevant strategies for urban functional layout optimization and public space environmental safety governance, with hoping to building an inclusive urban community with environmental safety and justice.

Keywords: perception, street, public, secure, governance

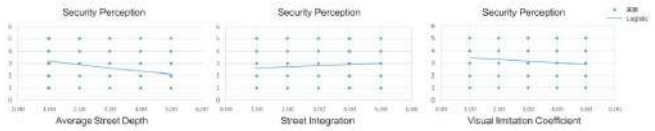
Depth map parameter analysis and point selection.



Depth map parameter analysis and point selection.

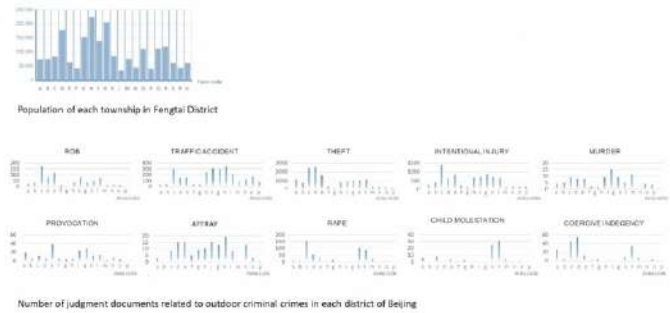
Depth map parameter selection point space

Logistic curve model estimation



Logistic curve model estimation

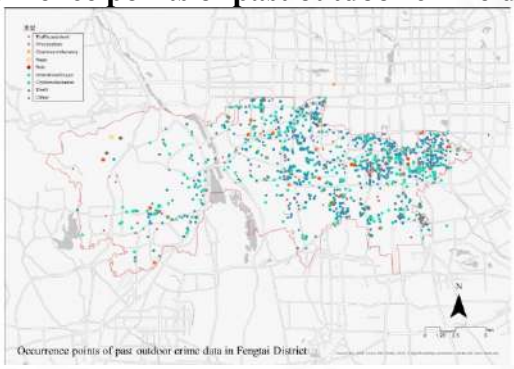
Number of judgment documents related to outdoor criminal crimes in each district of Beijing



Population of each township in Fengtai District

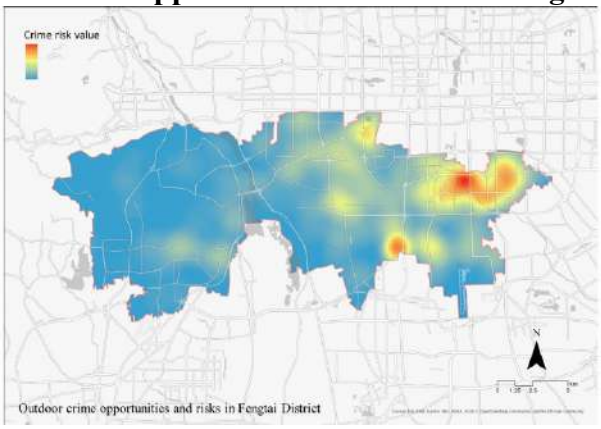
Number of judgment documents related to outdoor criminal crimes in each district of Beijing

Occurrence points of past outdoor crime data in Fengtai District

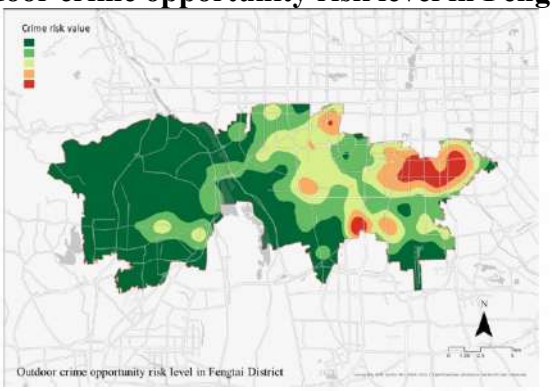


Occurrence points of past outdoor crime data in Fengtai District

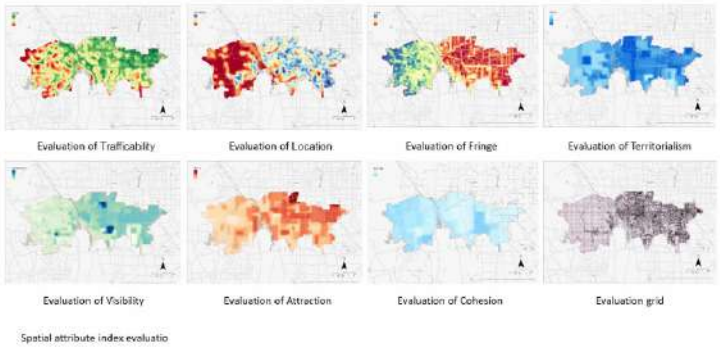
Outdoor crime opportunities and risks in Fengtai District



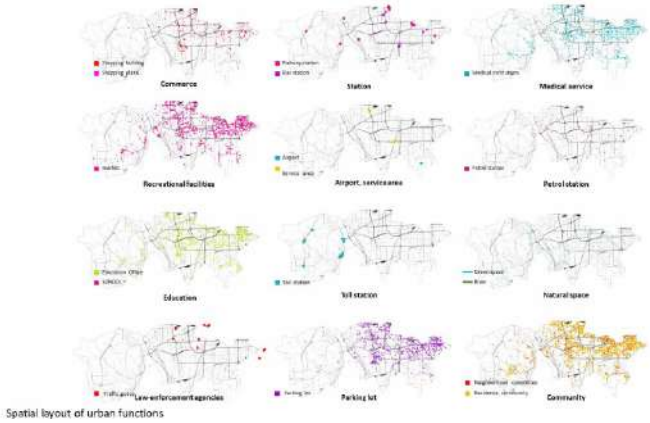
Outdoor crime opportunity risk level in Fengtai District



Spatial attribute index evaluatio



Spatial layout of urban functions



Spatial layout of urban functions

Correlation matrix of spatial attribute index

	Crime risk	Trafficability	Location	Fringe	Territorialism	Visibility	Attraction	Cohesion
Crime risk	1	0.5092	0.5541	-0.5696	-0.4133	0.5552	0.5182	0.5452
Trafficability	0.5092	1	0.523	-0.6103	-0.5431	0.5413	0.5619	0.4549
Location	0.5541	0.523	1	-0.8093	-0.57	0.682	0.5852	0.4827
Fringe	-0.5696	-0.6103	-0.8093	1	0.5715	-0.7165	-0.5815	-0.506
Territorialism	-0.4133	-0.5431	-0.57	0.5715	1	-0.601	-0.4172	-0.4231
Visibility	0.5552	0.5413	0.682	-0.7165	-0.601	1	0.5648	0.5031
Attraction	0.5182	0.5619	0.5852	-0.5815	-0.4172	0.5648	1	0.4429
Cohesion	0.5452	0.4549	0.4827	-0.506	-0.4231	0.5031	0.4429	1

The correlation matrix between crime opportunity risk and spatial attribute index is established by GISPRO band set.

Influence coefficient of badness

Criminal type	Rob	Traffic accident	Theft	Intentional injury	Murder	Provocation	Affray	Rape	Child molestation	Coercive indecency
Evaluation of badness perception	3.98	3.14	3.26	4.13	5	3.48	3.06	4.21	4.37	4.04

Damage assessment in risk assessment relies on public perception of different crime types. An evaluation table for the public's perception of the badness of various outdoor criminal crimes was set up by setting the criminal behavior attitude evaluation questionnaire, and the average value of the public's evaluation of the badness of various criminal crimes (1-5 points) was set as the badness impact coefficient.

Logistic curve model estimated the analysis results

Logistic model summary and parameter estimation of correlation between							
Dependent variable: Securuty Perception							
Equation	Model Summary					Parameter estimation	
	R2	F	Degree of freedom 1	Degree of freedom 2	Significance	Constant	b1
Logistic	0.097	55.157	1	938	＜.001	0.288	1.095
The independent variable is the							

mean road depth.							
Logistic model summary and parameter estimation of correlation between							
Dependent variable: Securuty Perception							
Equation	Model Summary					Parameter estimation	
	R2	F	Degree of freedom 1	Degree of freedom 2	Significance	Constant	b1
Logistic	0.004	2.002	1	938	0.158	0.378	0.981
The independent variable is road integration degree.							
Logistic model summary and parameter estimation of correlation between							
Dependent variable: Securuty Perception							
Equation	Model Summary					Parameter estimation	

	R2	F	Degree of freedom 1	Degree of freedom 2	Significance	Constant	b1
Logistic	0.014	12.927	1	938	＜.001	0.289	1.034
The independent variable is the visual qualification coefficient.							

The correlation constant between road average depth and psychological safety perception is 0.288, the correlation constant between road integration degree and psychological safety perception is 0.378, and the correlation constant between visual limitation coefficient and psychological safety perception is 0.353. The results show that (3) the influence of spatial attribute indexes on the perception of micro spatial psychological security decreases in order of cohesion and attraction, visibility, location sense and edge degree.

Results of correlation coefficient study(1)

1 Correlation between road choice degree and safety perception				
			Street Choice	security perception
Kendall tau_b	Street Choice	correlation index	1	-0.002
		Significance (double tail)	–	0.951
		N	940	940
	security perception 1	correlation index	-0.002	1
		Significance (double tail)	0.951	–
		N	940	940
**. At level 0.01 (two-tailed), the correlation was significant.				

2 Correlation between average street depth and safety perception				
			average street depth	security perception
Kendall tau_b	average street depth	correlation index	1	-0.296**
		Significance (double tail)	–	＜.001
		N	940	940
	security perception 1	correlation index	-.296**	1
		Significance (double tail)	0	–
		N	940	940
**. At level 0.01 (two-tailed), the correlation was significant.				
3 Correlation between street integration degree and safety perception				
			street integration	security perception
Kendall tau_b	street integration	correlation index	1	0.104**
		Significance (double tail)	–	
		N	515	515
	security perception 1	correlation index	0.104**	1
		Significance (double tail)	0.004	–
		N	940	940

**. At level 0.01 (two-tailed), the correlation was significant.				

Kendall correlation coefficient research results show (Table 4-8), (1) Road average depth, road integration degree, visual limitation coefficient and psychological safety perception are significantly correlated, that is, location sense, edge degree, cohesion, attractiveness, visibility are the main influencing factors of subjective safety perception of micro-street space; (2) Road average depth and visual limitation coefficient are negatively correlated with safety perception, road integration degree is positively correlated with safety perception, that is, location sense, cohesion, attractiveness and visibility are positively correlated with safety perception, and edge degree is negatively correlated with safety perception. Regression analysis was performed with the average road depth, road integration degree and visual limitation coefficient as independent variables (x) and safety perception as dependent variable (y). The Logistic curve model estimation and analysis results showed that the correlation constant between the average road depth and psychological safety perception was 0.288 (Figure 10, Table 9-11). The correlation constant between road integration degree and psychological safety perception was 0.378, and the correlation constant between visual limitation coefficient and psychological safety perception was 0.353. The results showed that (3) the influence of spatial attribute index on micro spatial psychological safety perception decreased in order of cohesion and attraction, visibility, location sense and edge degree.

Results of correlation coefficient study(2)

4 Correlation between visual integration degree and security perception				
			visual integration	security perception
Kendall tau_b	visual integration	correlation index	1	0.023
		Significance (double tail)	–	0.365
		N	940	940
	security perception 1	correlation index	0.023	1
		Significance (double tail)	0.365	–
		N	940	940

**. At level 0.01 (two-tailed), the correlation was significant.				
5 Correlation between visual limitation coefficient and security perception				
			visual limitation coefficient	security perception
Kendall tau_b	visual limitation coefficient	correlation index	1	-.081**
		Significance (double tail)	–	0.002
		N	940	940
	security perception 1	correlation index	-.081**	1
		Significance (double tail)	0.002	–
		N	940	940
**. At level 0.01 (two-tailed), the correlation was significant.				

Spatial attribute index evaluation system

First grade indexes	Second grade indexes	Detail
Spatial location attribute	Trafficability	The better the traffic, the better the traffic.
	Location	The location conditions of the street where the site belongs in the city, the location conditions are about convenience, the higher the sense of location.
Spatial form attribute	Fringe	The urbanization development degree of the site, the higher the development degree, the lower the fringe degree.

	Territorialism	The perceptibility of the space around the site.
Space atmosphere attribute	Visibility	The visual permeability of the human viewpoint, the fewer obstacles, the higher the visibility.
	Attraction	The vitality of the site material space and the flow of people, the greater the flow of people, the higher the attraction.
	Cohesion	The cultural characteristics of the site and the willingness of people to communicate, the stronger the willingness to communicate, the higher the cohesion.

"Migration a Positive Driving Force Facing the Current Environmental Crisis."

Carlos Marcelo Jankilevich Dahan[1]
[1]IFLA: International Federation of Landscape Architects
[2]IFLA-ICOMOS ISCL: International Scientific Committee on Cultural Landscapes (Advisory Member)
[3]LALI: Latin American Landscape Initiative
[4]ASOPAICO: Costa Rican National Association of Landscape Architecs
[5]CFIA - Costa Rican Federate Board of Engineers and Architecs

Demands arising from the global political agenda, in the face of the effects of urban growth, climate change, food insecurity, loss of biodiversity, migration and the war, underline the relevance of the ongoing environmental crises spreading with no limits, leaving their indelible mark on the Earth's terrestrial, atmospheric, and aquatic ecosystems. This irreversible devastation harms all living beings and their vital habitats calling for the pursue on committed and innovative responses such as those that landscaping and landscape architects can provide from their holistic, multi-scalar and polyfunctional vision. Migration, a global phenomenon, has increasingly resulted in the displacement of communities and the proliferation of temporary and permanent refugee and migrant encampments. The precariousness of people's health is affected by the lack of water and food sources, considerably escalating the vulnerability of these human groups and the rise of psychosocial problems.
The role of Landscape Architecture in the process of migrants` integration into the new environment is vital. What happens after people leave the landscape that they identify themselves with? What do people do with new landscape once they arrive? To what extent do migrants pass on their customs and tradition in their new surroundings? Which is the impact of these forces shaping the territory and exerting pressures for land use change due to the different types of migration.

Landscape is the natural living space for people, rooted in one place, nomadic or migrant, human groups have a right to landscape. Diverse communities with unique needs and desires will have differing visions and pursue different outcomes This inevitably leads to conflicting expectations and interests. Global change, land degradation, social unrest and warfare further aggravate these potential conflicts. It is the challenge for landscape architects to find valid solutions also preserving a sense of belonging.

Rather than describing a state of facts, this paper aims to contribute to set up a challenge for an action-oriented interactive movement. By doing so, poses that landscape architecture's role in addressing the challenges of migration and population displacement might and ought to become a positive driving force in the dynamics to face the current environmental crisis.

Landscape architects and planners may find ways toward more organic practices leading to open-endedness, flexibility, resilience and adaptation.

Landscape is a unique opportunity to strengthen resilience since it integrates; all forms of biodiversity with the identity of human groups that seek a new encounter with nature, food security and territorial justice. In this regard, the potential role of productive landscape in

migrant's settlements and farms might provide solutions capable to transform them into permanent communes, with capacity of providing goods and resources for their subsistence promote adaptability and resilience as well as strengthening identity and social integration.

Moving from refugees' camps to refugees' farms Landscape Architecture might enhance solutions capable to transform them into permanent communes, with capacity of providing goods and resources for their subsistence, promote adaptability and resilience as well as strengthening identity and social integration.

Keywords: Migration, Landscape, Biodiversity, Resilience, Communities

Planning and design methods for avian habitats in Beijing

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[Objective] Urban biodiversity is an essential component of urban human settlement environments. Constructing suitable habitat environments for animals is a crucial method for enhancing urban biodiversity. However, current research on animal habitats often focuses on rare or wild animals within large conservation areas, lacking studies on the protection and environmental enhancement of animals accessible to urban residents. This paper focuses on avian habitats, aiming to explore design methods with the ultimate goal of improving ecological service functions and providing references for integrating animal habitat spaces into urban green spaces.
[Method] The study area is Sijiqing Town, Haidian District, Beijing. The methodology employed in this paper includes literature review, website data collection, expert consultations, rapid biodiversity imaging surveys, and transect surveys. Through these methods, we aimed to understand the environmental baseline conditions and identify the existing bird species as well as those with potential for survival. Utilizing spatial analysis tools, we assessed the spatial structure of constructing a network of avian habitats. Grounded in the selection requirements of birds, efforts were made to enhance the quality of habitat environments for feeding areas, water sources, nesting sites, and shelters.
[Results] The habitats in the study area were classified into 6 major categories and 13 subcategories, and a current habitat distribution map was generated. Through bird surveys, target species for protection and restoration were determined, totaling 145 species distributed in 22 orders and 49 families. We assessed existing habitats based on biodiversity, patch size, and human disturbances to select habitat source areas. We evaluated existing habitats based on bird migration resistance and dispersal capacity to establish the habitat connectivity structure. Additionally, we integrated environmental requirements of bird for feeding areas, water sources, nesting sites, and shelters. We conducted habitat environmental design from three aspects: vegetation, water bodies, and facilities to improve the quality of bird habitats.
[Conclusion] The conservation of urban biodiversity has become a crucial and urgent task in 21st-century urban ecological development. This paper explores planning and design methods for creating avian habitats, representing a significant integration of landscape architecture and ecological practices. This exploration holds crucial significance for enhancing urban biodiversity, leveraging the ecological functions of urban green spaces, and fostering harmonious coexistence between humans and animals.

Keywords: avian habitats, urban biodiversity, spatial structure planning, environmental design

Designing as Storytelling; Participatory Design Research from the Australian Borderlands

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This paper asks attendees to consider design through the foundational lens of story. Story is the basis of worlds, and so grounds the possibility for exchange across worlds in the pluriverse. Stories of who we are, where we are going, and why we are going, underwrite the world that is designed. That designed world is then also encoded with, and propels those stories.

Attending to design as story then helps us bring the responsibility of design-agency into greater focus. Engaging with design as a story-form allows us to draw attention to questions at the foundation of the socio-ecological crises we now confront. What were the stories that underwrote the world-ending designs and design practices that delivered us to this point? Whose stories were these and whose stories were excluded?

At this critical juncture, in which Landscape Architecture advocates the new found scale of its concern and responsibility, we need to consider the risks of merely increasing the scale and claim of existing forms of design agency, without questioning the foundational stories that underwrite them. Further than articulating a new era of agency and responsibility for design, we need to confront the way designs have produced these circumstances and the stories that underwrite them.

Indigenous stories from across the globe have collectively underwritten socio-ecological systems of life that have sustained across time. The Noongar cosmos of South-Western Australia, has been held in continuity through the strength of stories grounded in the land and passed across generations for more than 47000 years. These stories are amongst the oldest on earth. Amid the socio-ecological crisis of the Capitalocene, the short story of modernity/coloniality and its designs can now be read amongst those of past civilisations fallen, and against the continuity of Noongar stories that have held their cosmological world strong in place through deep-time.

In charting a shared path forward through design, we must consider how we can depart from the stories that have led us on this path, and how to develop modes of collaborative designing that can accomodate a multitude of stories in the pluriverse. In designing to confront crises of this scale, we should be paying foremost attention to stories that underwrite worlds which last. Design agency, understood as a practice of sharing-story, offers a pathway for addressing socio-ecological crises though the redesigning of design-agency itself.

Working through the implications of literature from the decolonial, transitional and ontological turn for design-research and practice, this paper will offer methodological lessons and practical insights from a decolonial, participatory action, design-research studio working with Noongar Birdiya (leaders) and stories on Noongar Boodja (Land) in the West Australian borderlands.

Keywords: Decoloniality, Participatory Action, Indigenous Story, Design Agency, Socio-ecological

Storytelling as Design at Matagarup Sacred Fire in Boorloo (Perth)

Whadjuk Noongar Elder Herbert Bropho at Matagarup Sacred fireplace, in Boorloo (Perth), Western Australia presenting a collection of stories about the Noongar cosmos, his ancestral relationship to this place, histories of activism and resistance, and the insitutional and socio-ecological dynamics of colonisation on his ancestral lands. Evicted multiple times over decades during protests from the same camps his Ancestors maintained here for Millennia; Herbert's ongoing practice of storytelling holds strong an ancestral co-becoming with this place, while resisting disposession of by Settler-colonial narratives of development.

Accessibility-based analysis of green open space supply and demand equity

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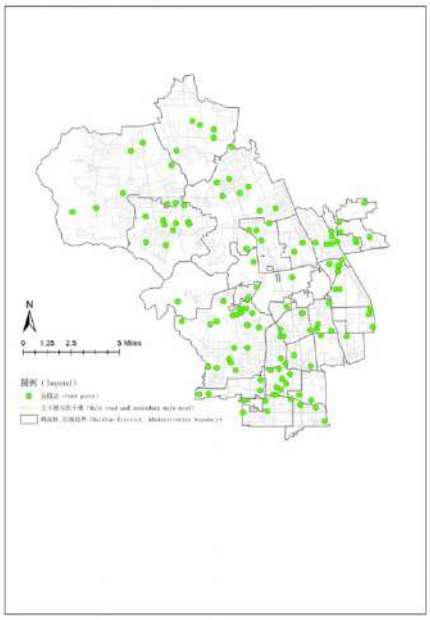
[Objective] Due to the limited space of urban land, the mismatch between the supply and demand of urban green space and the population, and the inequity are increasingly emerging. The current quantitative research on the relationship between supply and demand of green space mainly takes urban parks as the research object, ignoring the green open spaces that residents use more frequently, such as mountains, forests, riverside green spaces, and greenways in cities. The balance between supply and demand of urban green open space is the key to improving residents' sense of acquisition and happiness in daily recreational space, and is of great significance to future urban green space planning. [Method] According to the definition and classification of urban green open space, the Gaussian two-step mobile search method was optimized, using high-precision population raster data and park POI data, taking Haidian District of Beijing as an example, from the population demand, accessibility level, The supply-demand relationship and spatial configuration of green open space in Haidian District are analyzed from the aspects of supply blind area and spatial autocorrelation. [Result] The central urban area in the southeast of Haidian District has the largest demand, but the smallest supply; the northwest has the smallest demand, but the largest supply; in terms of accessibility, the overall area is relatively low, and 67% of the residents recreation experience level does not reach the average, and the distribution shows a polarized trend of high in the northwest and low in the southeast, with the northwest and central regions having the highest accessibility and the southeast having the lowest accessibility. There is a 23% supply blind space in the whole area. In the west and southeast, there is a serious spatial mismatch of oversupply and undersupply.[Conclusion] (1) The accessibility of Haidian District is generally low, with a trend of high in the northwest and low in the southeast. (2) The relationship between resource allocation and supply and demand is seriously unbalanced, and the space where supply exceeds demand is mainly concentrated in the southeast; the space where supply exceeds demand is mainly concentrated in the northwest. (3) Compared with park green space and small green space, urban forests, greenways, and riverside green spaces have a greater impact on the supply and demand relationship of urban green space. (4) In terms of the distribution of supply blind spots, according to the reasons for the formation of supply blind spots in various regions, put forward the future optimization directions to improve the balance of supply and demand of green open space, such as exploiting potential space, utilizing vacated space, establishing convenient transportation, and utilizing social forces, so as to provide a basis for urban green space construction and the improvement of residents' living well-being.

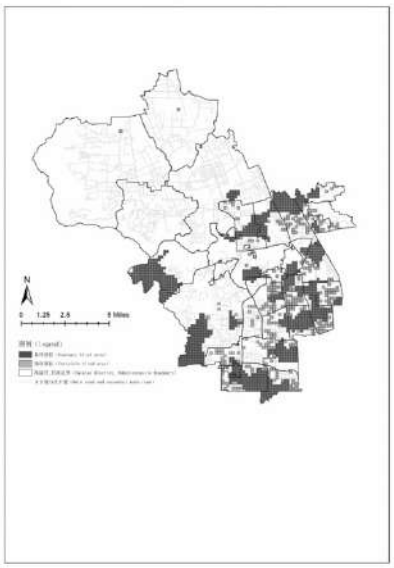
Keywords: urban green open space,accessibility,justice,spatial planning,supply and demand,

Fig. 1 Distribution of greenspace center points in the park



The urban parks are transformed into point elements through the arcGIS10.8 platform.

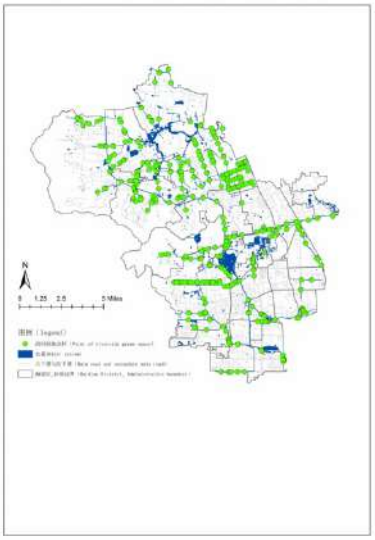
Fig. 10 Distribution of dominant and recessive blind spots in accessibility



In order to identify areas with insufficient supply more accurately, their accessibility blind zones need to be analysed. Areas with 0 accessibility are obvious blind zones, and areas with a population density greater than the average level of Haidian District of 0.75 million people/km² and with accessibility less than the 20.5 m² of green space per capita per person of the whole district of Haidian District in the plan of 2035 are hidden blind zones. According to Figure 10, it can be seen that the accessibility blind zones in Haidian District are mainly concentrated in the northeastern, southeastern, southern and southwestern regions, accounting for 23% of the study area, with about 17% of the explicit blind zones and 6% of

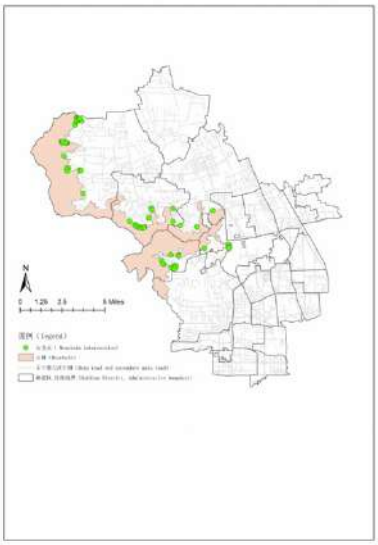
the implicit blind zones. The results show that about 17 per cent of Haidian residents cannot reach any green open space within a 15-minute walk, and 6 per cent of the areas with accessibility greater than 0 cannot meet the needs of residents because of the high population density of the green open space.

Fig. 2 The distribution of riverside greenery center points



The river is transformed into point elements through the arcGIS10.8 platform. Because the green open space along the river cannot be expressed by a single centre-of-mass point due to its narrow shape and large area, this paper transforms the point of its intersection with the main road into a centre-of-mass point for this area based on accessibility.

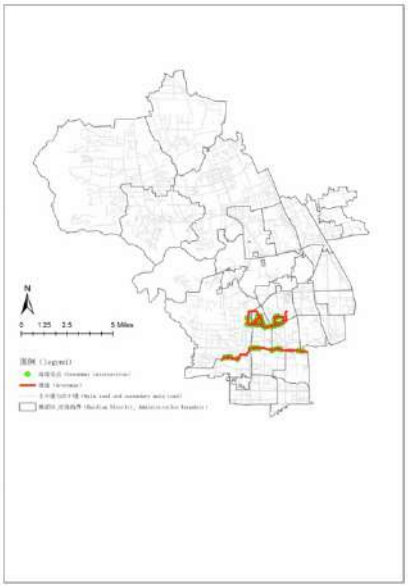
Fig. 3 Distribution of centroids of mountains and forests



The mountains and forests are transformed into point elements through the arcGIS10.8 platform. Because the green open space of the mountain forest cannot be expressed by a

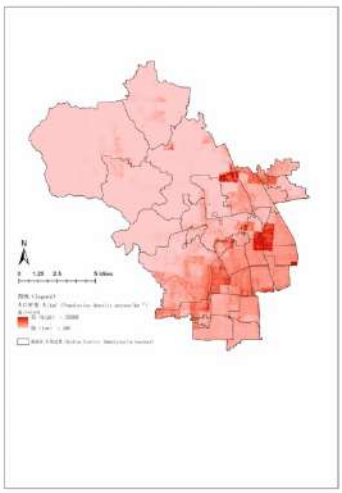
single centre-of-mass point due to its narrow shape and large area, this paper transforms the point of its intersection with the main road into a centre-of-mass point for this area based on accessibility.

Fig. 4 Greenway centroid distribution



The greenway space is transformed into point elements through arcGIS10.8 platform. Since the green open space of the greenway cannot be expressed by a single centre-of-mass point due to its narrow shape and large area, this paper transforms the point of its intersection with the main road into a centre-of-mass point for this area based on accessibility.

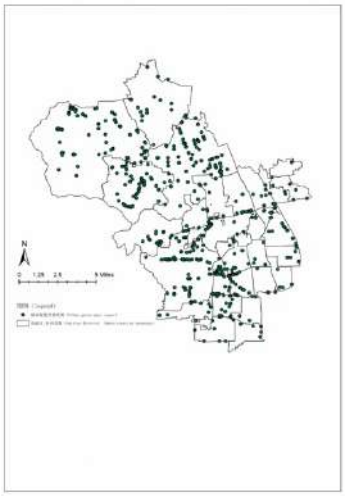
Fig. 5 Population density grid map



*The population data is derived from the 2020 100m*100m population raster data provided by the WorldPop website. According to the high-precision population density raster map of Haidian District (Figure 5), the population density is higher in the southeast of Haidian*

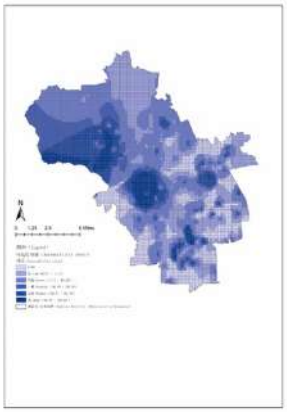
District and lower in the northwest.

Fig. 6 Distribution map Of green open space



Through arcGIS10.8 software, the centre of gravity points of urban parks in Haidian District and the centre of gravity points of green open spaces along greenways, rivers and mountain forests are superimposed to obtain the distribution map of green open space centre of gravity points in Haidian District. From Figure 6, it is learnt that the green open space in Haidian District is concentrated in the central area, while the southeastern part of the district, which is more densely populated, is affected by denser construction land, and the distribution of green open space is scattered and less. Combining the data in Figures 5 and 6, it can be seen that there is a serious mismatch between the supply of urban green open space and the demand of residents in Haidian District.

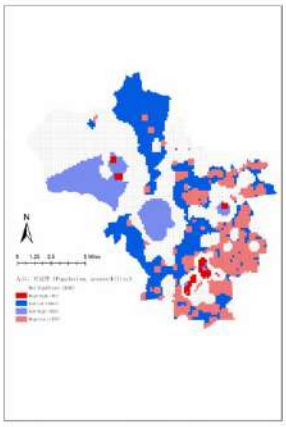
Fig. 7 Distribution map of accessibility grades in Haidian District



The accessibility of green open space is classified into six levels through the natural breakpoint method: 0, low, lower, average, higher, and high. According to Figure 7, it can be seen that the distribution of accessibility under the condition of 15-minute walk for residents is generally high in the north-west and low in the south-east. Areas with high and higher accessibility are distributed in the northwest and central part of Haidian District, and a small

amount is distributed in the southeast area, accounting for 15% of the study area, mainly in the east of Xiangshan Street, the middle of Hot Spring Town, and a small amount in the northeast of Qinglongqiao Street, Shuguang Street, Huayuan Road Street, Haidian Street, and Zizhuyuan Street. The area with average accessibility is the least, accounting for 11% of the study area, and is mainly located in the northern part of Sujiatuo Town. Areas with low and lower accessibility ratings are the most numerous, accounting for 57% of the study area, and are concentrated in the northern and southeastern parts of Haidian District, mainly in Shangzhuang Township, Xibeiwang Township, and Malianwa Street. Areas with accessibility of 0 are concentrated in the south-west of Xiangshan Street, the south-west of Sijiqing Town and Wanshoulu Street, the central and northern parts of Malianwa Street, Qinghe Street, Xisanqi Street, and the streets of College Road, Zhongguancun Street, North Shimonoseki Street, Ganjiakou Street, and Beitaipingzhuang Street, which account for 17 per cent of the study area.Based on the calculation principle of the two-step moving search method, the accessibility of green space is actually the weighted per capita green space area. The per capita green space area in Haidian District in 2020 is 13.99 m²/person, about 67% of the area does not reach the average level, most of the residents' needs are not met, and the layout of the urban green public space is inequitable.

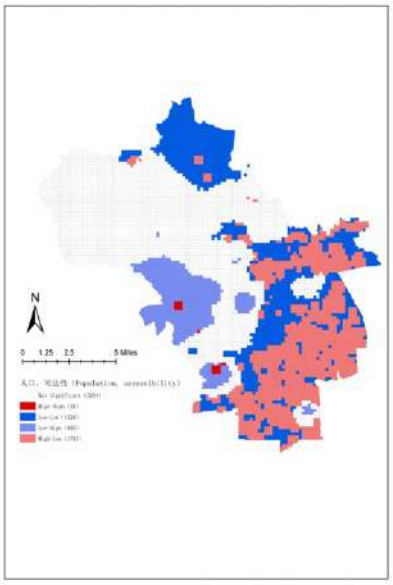
Fig. 8 Reachability in the 1500m search domain



By comparing the changes in accessibility at different search radii of 5 and 15 minutes, the spatial mismatch between supply and demand of green open space was identified. Using the bivariate Local Moran's I, the relationship between accessibility and population density was classified into five categories: Not Significant means that the relationship between accessibility and population density is not significant; H-H (High-High) clusters refer to high accessibility and high population density areas; L-L (Low-Low) clusters refer to low accessibility and low population density areas; L-H (Low-High) clusters refer to low accessibility and low population density areas; and L-H (Low-High) clusters refer to low accessibility and low population density areas. are low accessibility, low population density areas; L-H (Low-High) clusters refer to low accessibility, high population density areas; and H-L (High-Low) clusters refer to high accessibility, low population density areas. The accessibility index is positively correlated with population density in areas where H-H and L-L cluster types are located. In the regions where L-H and H-L clusters are located, the accessibility and population density show a negative correlation, and spatial mismatch

problems such as supply exceeding demand or supply exceeding demand occur. According to Figures 8 and 9, it can be seen that when the search radius varies, the accessibility shows an obvious spatial differentiation pattern. In the 5-minute search radius, 21 units belong to the H-H cluster, 1524 units belong to the L-L cluster, and 1717 units belong to the H-L cluster, i.e., the area of supply over demand. There were 689 units that belonged to the L-H cluster, i.e., areas where supply exceeded demand.

Fig. 9 Reachability in the 500-meter search domain



As the search radius time increases to 15 minutes, the H-H, L-L, and L-H clusters increase, the L-H cluster decreases, and the supply-over-demand units increase to 829, and 1,257 supply-over-demand spatial units remain. In both scenarios, the mismatched units with more supply than demand of urban green public space are mainly concentrated in the western region, while the mismatched units with less supply than demand are mainly concentrated in the central urban area in the southeast of the study area, which are concentrated in Malianwa Street, Xisanqi Street, Zhongguancun Street, Haidian Street, Shangdi Street, Beixiaguan Street, Ganjiakou Street, Huayuan Road Street, College Road Street, and Wanshou Road Street. On the one hand, due to being in the old city, earlier development and construction, and scarce land resources, the distribution of the current urban green open space is relatively small. On the other hand, due to the high population density, the green space area per capita is lower and the accessibility is lower. It can be seen that the central urban area in the southeastern part of Haidian District is experiencing a serious shortage of green open space supply, and optimisation measures such as additional parks and green spaces need to be taken in order to meet the recreational needs of the residents.

Quantifying Visual Features of Chinese Traditional Gardens using Deep Learning

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Chinese Traditional gardens (CTGs) boast a rich history spanning thousands of years. As pivotal landscape heritage sites, they serve as a blueprint for the construction of modern gardens. However, rapid urbanization has precipitated the hurried development of urban parks and green belts, often overlooking the spatial construction principles of CTGs. While there is a wealth of detailed studies on specific elements within CTGs, comprehensive quantitative analyses are still lacking. Moreover, existing theoretical frameworks for understanding the spatial characteristics of CTGs are limited in their applicability and validation. Deep learning has emerged as a popular tool in quantitative research on urban landscape perception, facilitating quantitative investigations from a human-scale perspective and enabling a closer integration of subjective experiences with objective metrics.

In this context, this paper presents an empirical study of four traditional gardens in Suzhou, China: Liou Garden, Canglang Pavilion, Net Master Garden, and Art Garden. Utilizing a SegNet convolutional neural network, a deep learning algorithm is employed to semantically segment the visual landscape elements of the traditional garden path space. The study employs a random forest human-computer adversarial scoring model to assess subjective perceptions of coherence, complexity, legibility, and mysteriousness within traditional garden spaces. Additionally, a quantitative research model of the subjective and objective correlation of visual characteristics is constructed by analyzing the relationship between visual form characteristics and visual perception of traditional garden landscape space using the multiple linear regression model.The primary findings are as follows:

(1) The SegNet convolutional neural network proves to be a suitable model for quantitatively decomposing traditional garden visual landscape elements.

(2) The results of the regression model showed that the 10 landscape element index systems - roadway openness (RO), green visual ratio (GVR), building proportion (BP), blue vision ratio (BVR), rockery topography proportion (RTP), stone placement proportion of (SPP), sky visibility (SV), ratio of trees, shrubs, and grasses (RTG), visual complexity (VC), and color of the space (CS) - exhibited significant differences in the effects of the four subjective perceptual dimensions. RO and BP are positively correlated with spatial coherence and legibility of traditional gardens, while GVR, RTP, and VC are positively correlated with spatial complexity and mystery.

Our analytical study advances the methodology of quantitative research on spatial perception of garden landscapes, offering insights with a certain universality. The findings elucidate the influence of different landscape elements within traditional gardens on visitors' psychological perceptions. Furthermore, grounded in the humanistic perspective, these findings provide designers with more intuitive spatial planning strategies for garden design.

Keywords: traditional garden, visual landscape perception, semantic segmentation, psychological response;

Social Justice in Istanbul's Urban Green Spaces: A Multi-Dimensional Evaluation

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Cities are complex systems that contain social structures along with their physical infrastructure. Within this system, the presence of social inequalities interacts with the built environments of cities. Urban green areas, defined as part of the built environment, are important in preventing social inequality by equitably distributing access and reducing disparities in qualifications and services. In addition to focusing on the built environment, users need to be included in the process so that all individuals can benefit fairly from the social benefits offered by green spaces.

The concept of Social Justice, introduced by anthropologist Low (2013; 2023), explains physical and social interaction in the city by focusing on the spatial dimensions of social inequalities. Social justice involves a multidimensional approach includes objective elements regarding the distribution, access and qualitative characteristics of public spaces, as well as subjective elements aimed at understanding users' perception, satisfaction etc. To this end, Low proposes to examine the relationship between social justice and public spaces in six dimensions that are redistribution of resources, participation in procedural processes, recognition and acceptance of differences, promotion of interaction, care of others and repair of space and appropriate information and marking.

This paper presents a section covering a method used in research that aims to develop a multidimensional assessment tool in order to provide conceptual clarity to various factors that create social injustice in green areas and to establish social justice. By focusing on the unique dynamics of Istanbul, which was chosen as the sample area, the conceptual information obtained from the literature must be made measurable in order to understand what the social justice dimensions are. For this purpose, a two-stage research method was adopted and results will be shared in this paper. Firstly, indicator set contains operational definition, relevant parameters, variables and analysis methods for the six dimensions of the social justice - public spaces relationship was determined by systematic literature review. The indicator set created includes a total of 41 criteria in 12 categories for measuring social justice in the context of urban green areas. Secondly, considering that the indicator set created should be specific to the location, an expert panel module has been added to reorganize the indicator set within the framework of the dynamics of Istanbul. Social justice indicators and their relative weights appropriate to Istanbul's local conditions will be determined by a participatory method with the expert panel. It is aimed to obtain the opinions of landscape architects and other related disciplines as well as practitioners, researchers and experts in non-governmental organizations, using the Delphi technique.

To conclude, the study focuses on social justice as a fundamental guiding principle and tool for planning, assessing the performance and improving urban green spaces in İstanbul. This approach aims to bring the issue of green areas and social inequality to the agenda of relevant city stakeholders and to propose a multi-dimensional assessment that will help them develop inclusive design, determine investment and policy to promote justice and prevent social inequality.

Keywords: Social Justice, Urban Green Areas, Delphi Technique, Istanbul

Exploring Pathways for Child-Friendly Play Spaces in Undeveloped Regions

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In undeveloped regions, children often lack adequate infrastructure, educational and medical resources, and space for activities. That makes them more susceptible to illness or stunted development, and they may face multiple challenges to their physical and mental health. An extensive literature from Cognitive Science has established that children's social, cognitive, and motor development is promoted by play,and play spaces are inexpensive and flexible. For undeveloped areas that struggle to provide quality education, play is critical for children to acquire skills, promote physical and mental development, and foster creativity.
This article is based on cognitive and developmental science and proposes a way for constructing child-friendly play spaces which are adapted to the undeveloped regions. First,the article reviews the body of knowledge from Cognitive and Developmental Science concerning the association between play and learning. It studies the learning mechanism through play from three aspects::Physical opportunities and challenges, active exploration, and social interaction,investigating the designs usher the most beneficial play behavior. Second, considering the current development status of undeveloped regions and following the principles of low-cost, localization, and sustainability, we propose practical solutions such as repurposing abandoned facilities, utilizing locally-sourced materials, and constructing simple, creative venues,encouraging the construction of non-elaborated, non-uniform play spaces.Besides, The article also provides practical examples to illustrate these ways. This article aims to investigate an effective approach to improving the living conditions of children in undeveloped regions. This involves not only improving infrastructure but also promoting fairness, justice, and sustainable development for the future.

Keywords: child-friendly,play spaces,undeveloped regions,cognitive and developmental science

Green Space Inequalities in Istanbul: An Assessment of Spatial Justice

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Accessibility is an important factor in ensuring that urban residents can easily access green spaces and equally benefit from them (Vickerman, 2019). Spatial justice focuses on equal access to and distribution of environmental resources (Schlosberg, 2013).

This study aligns with the diversity, equity, and participation themes under the conference's call to action on societal inequalities and spatial justice.

The primary aim of this research is to examine the spatial distribution of green spaces in Istanbul in the context of environmental justice, identifying regional needs for green spaces and determining areas requiring priority intervention.

The study involved analyzing the amounts, types, and accessibility of green spaces across Istanbul's 39 districts, assessing the current situation. The analysis aims to identify inequalities in the distribution of urban green spaces and to determine priority intervention areas with a holistic approach for the creation of new green spaces.

Data from the Istanbul Metropolitan Municipality (IMM) Green Space Management System (GSMS) project was used to evaluate Istanbul's green spaces. The GSMS project is a database developed to inventory green spaces in Istanbul, assess their conditions, and manage them.

The study's methodology utilized unit area and superimpose methods for data analysis. Objective data were reduced to per unit area using the unit area method, standardized, and scored. To convert multidimensional data, which are not qualitatively and quantitatively equivalent, into a single-dimensional, tangible, and measurable form; Istanbul was divided into spatially equivalent hexagons with a 250-meter radius, considering walking distances. All data were then mapped to these equivalent areas through GIS applications.

However, where reducing data to per unit area was not suitable or meaningful due to the data's format or quality, the superimpose method was preferred. This method allows for the combination and analysis of different data types and the holistic evaluation of results.

The study revealed four important findings. Maps showed the priority areas for open and green space needs across Istanbul (Map 1.1), areas suitable for public acquisition in Istanbul (Map 1.2), the map of green space needs and ease of public acquisition in Istanbul (Map 1.3), and areas for intervention within metropolitan residential areas (Map 1.4). In the metropolitan residential area, Zones A, B, and C were identified as priority areas for need, public acquisition, vulnerable populations, blue-green infrastructure, and ecological function (Map 1.5).

The study concludes that examining Istanbul's green spaces from perspectives of spatial justice and accessibility reveals significant insights for strengthening urban green

infrastructure and promoting social equity. The analyses provide a strategic roadmap for city planning and green space management by identifying areas requiring priority intervention. This model developed for Istanbul serves as an example for both promoting the efficient use of existing green spaces and centering socio-demographic needs and environmental justice in the creation of new green spaces.

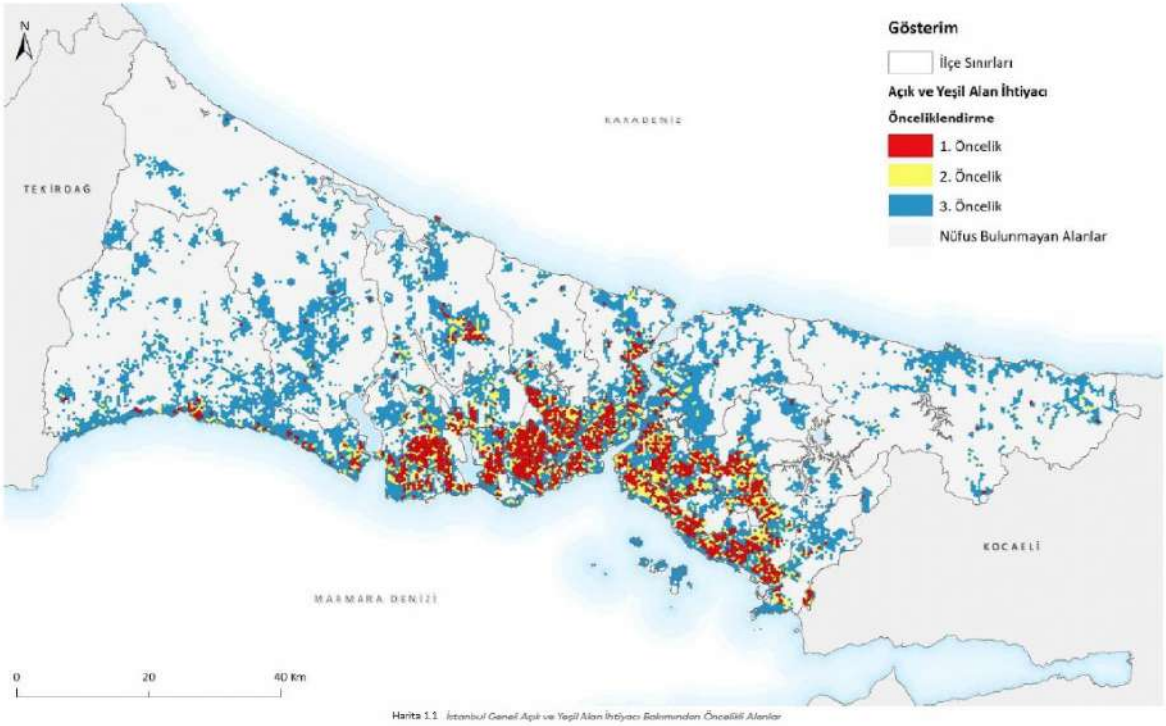
References:

Vickerman, R. (2019). Urbanization, Accessibility, and Environmental Justice: A Review of the Literature. Urban Studies, 56(2), 285-310.

Schlosberg, D. (2013). Theorising Environmental Justice: The Expanding Sphere of a Discourse. Environmental Politics, 22(1), 37-55.

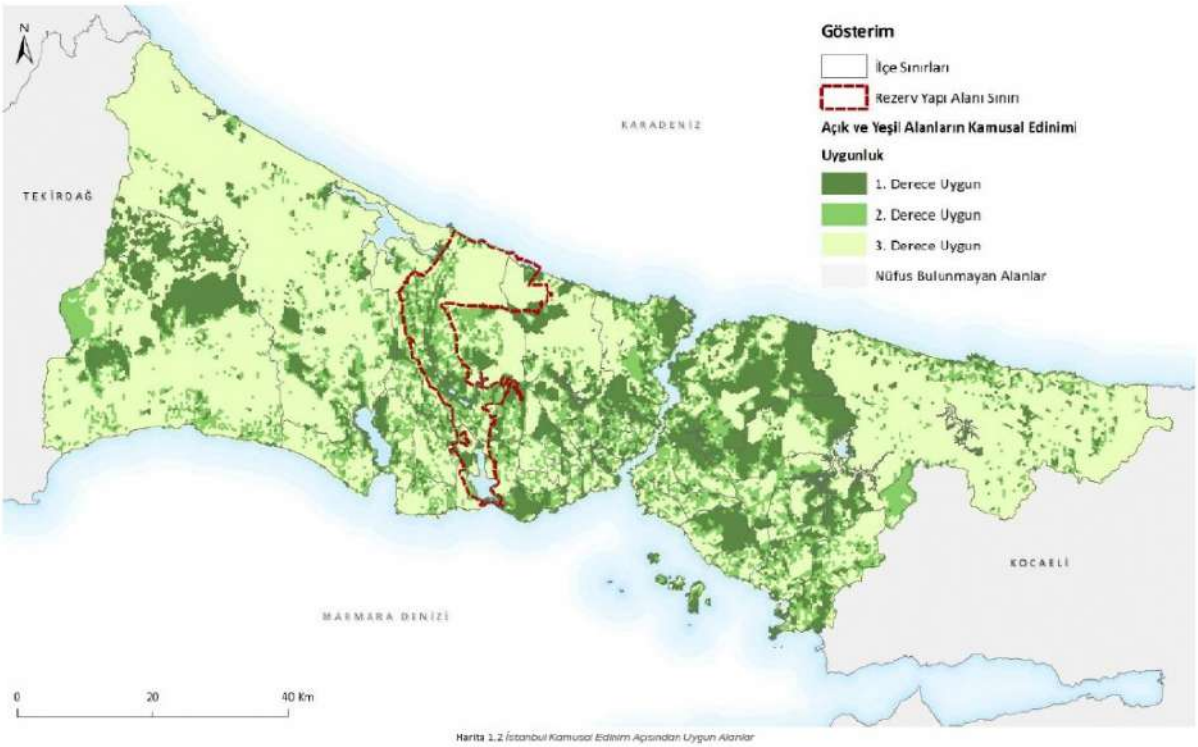
Keywords: spatial justice, accessibility, green space systems

Harita 1.1 İstanbul Geneli Açık ve Yeşil Alan İhtiyacı Bakımından Öncelikli Alanlar



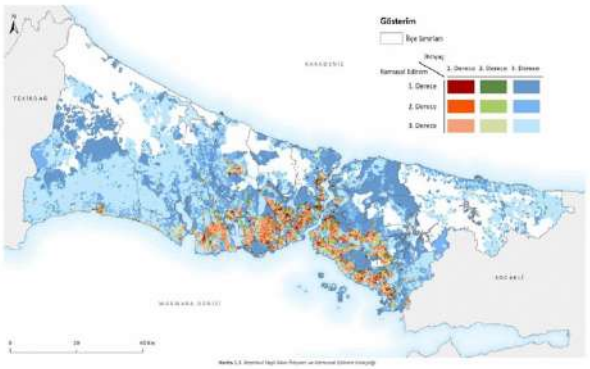
Harita1.1 İstanbul Geneli Açık ve Yeşil Alan İhtiyacı Bakımından Öncelikli Alanlar

Harita 1.2 İstanbul Kamusal Edinim Açısından Uygun Alanlar



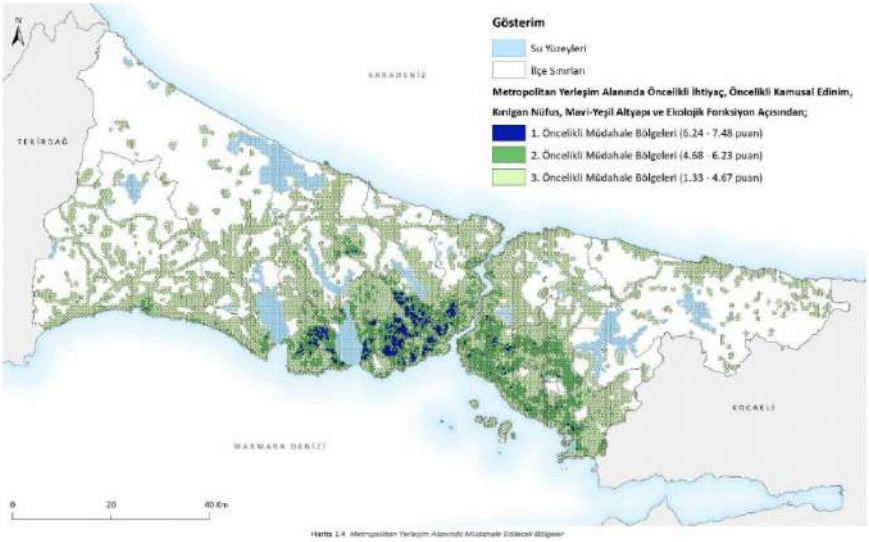
Harita 1.2 İstanbul Kamusal Edinim Açısından Uygun Alanlar

Harita 1.3 İstanbul Yeşil Alan İhtiyacı ve Kamusal Edinim Kolaylığı



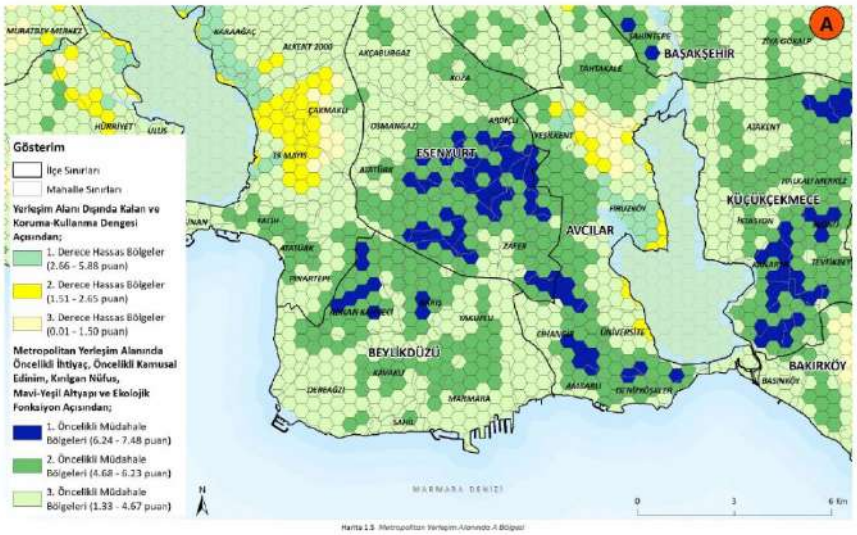
Harita 1.3 İstanbul Yeşil Alan İhtiyacı ve Kamusal Edinim Kolaylığı

Harita 1.4 Metropolitan Yerleşim Alanında Müdahale Edilecek Bölgeler



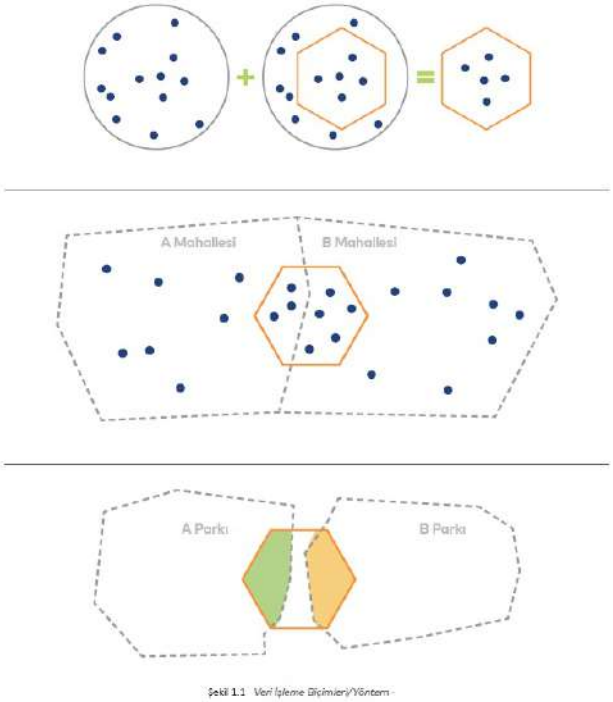
Harita 1.4 Metropolitan Yerleşim Alanında Müdahale Edilecek Bölgeler

Harita 1.5 Metropolitan Yerleşim Alanında A Bölgesi



Harita 1.5 Metropolitan Yerleşim Alanında A Bölgesi

şekil 1.1 Birim alan yöntemi



Şekil 1.1 Veri İşleme Düzeyleri/Yöntem

Şekil 1.1 Birim alan yöntemi

Associations between socioeconomic status and multi-hazard exposure risks in Shenzhen

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With ongoing global warming, the frequency of extreme weather events is increasing. Some cities are exposed to multiple natural hazards, including seawater inundation, extreme heat, and pluvial floods. However, hazard exposure risk varies among individuals with different socioeconomic statuses in urban areas. In previous studies, there have been some discussions on climate justice in Western cities, but the issue of climate justice in Chinese cities remains understudied. This study investigates the relationship between multi-hazard exposure risks and average house prices in Shenzhen, Guangdong, China. Initially, multi-hazard exposure risks for each community were examined. Temperature data were calculated using ENVI software with remote sensing images. Seawater inundation risk was estimated using GIS software based on sea-level rise prediction and storm surge data. The pluvial flood risk was predicted through a Naive Bayes classifier based on historical flood inventories and multiple datasets, including precipitation, topographical, and anthropogenic data. Subsequently, the average temperature, seawater inundation risk, and pluvial flood risk were determined for each community. Additionally, the average house price for each community was collected using web scraping techniques from the local real estate website Anjuke. The correlation between disaster exposure risk and average house price in each community was then explored using Geoda software, employing Ordinary Least Squares (OLS) and Spatial Error Model (SEM). The OLS method revealed significant spatial autocorrelation (Moran's $I = 0.6994$, $P < 0.001$). Further SEM analysis unveiled a significant negative correlation between average temperature and average house price (Coefficient = -613.086, $P < 0.005$). Conversely, seawater inundation risk exhibited a significant positive correlation with average house price (Coefficient = 32191.9, $P < 0.001$), while the correlation between pluvial flood risk and average house price was insignificant. The findings highlight the diverse exposure risks experienced by different populations in Shenzhen, China, indicating a nuanced environmental equity scenario compared to Western cities. The study's results offer valuable insights for Chinese coastal cities in addressing climate change challenges and advancing environmental justice initiatives.

Keywords: Global warming, Extreme weather, Climate justice, Multi-hazard exposure risks, Socioeconomic status

Assessment and Optimization of RRA service in Urban Green Spaces

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Urban green spaces offer residents a variety of recreational services that enhance their well-being and improve physical and mental health. However, certain recreational activities may have negative impacts on the ecological environment or personal safety, leading to restrictions by management authorities in urban green spaces, such as camping, fishing, skateboarding, and park fairs, referred to as Restricted Recreational Activity (RRA) in this study. With the implementation of policies for the open sharing of green spaces in China in recent years, RRAs have been increasingly subject to trial relaxations of these restrictions, providing residents with many new and attractive services. Concurrently, numerous mobile apps have been developed to allow tourists to upload recommended activity locations within green spaces, such as camping sites or fishing spots, generating a vast amount of Volunteer Geographic Information (VGI). Currently, there is a lack of statistical study and research on RRA in urban green spaces, necessitating an assessment to guide urban managers in achieving a balance between supply and demand for green space services at the lowest cost and with fairness. This study takes Suzhou City, China, as an example and utilizes VGI data to assess the service levels of RRAs in urban green spaces. Initially, VGI data from various apps were collected, such as Fishing People, Wild Tour Land, Slide or Not, etc. Text semantic analysis and descriptive statistics were employed to quantify the service levels of various activities within different RRAs. Secondly, based on the degree of supply and demand coordination and the Analytic Hierarchy Process (AHP), an evaluation system was developed to assess the comprehensive level of urban green spaces in providing RRAs and the level of supply and demand coordination. Population density, Points of Interest (POI), and other multi-source data were also used in the evaluation. Finally, based on the evaluation results, areas with supply and demand imbalances for RRA were identified, and targeted optimization strategies were obtained through retrospective analysis. The study found significant spatial differentiation in the service levels of supply and demand for RRA in cities. The results can guide urban managers to orderly adjust management measures for urban green spaces, balancing environmental protection with resident activities, providing equitable services to residents in different areas of the city. Specific optimization strategies were proposed to enable managers to choose different open policies based on the specific conditions of urban green spaces.

Keywords: Recreational Activities, Green Space Open Sharing, Supply and Demand Coordination, Social Equity, Volunteer Geographic Information Data

Spatial variation of perceived equity across protected area communities

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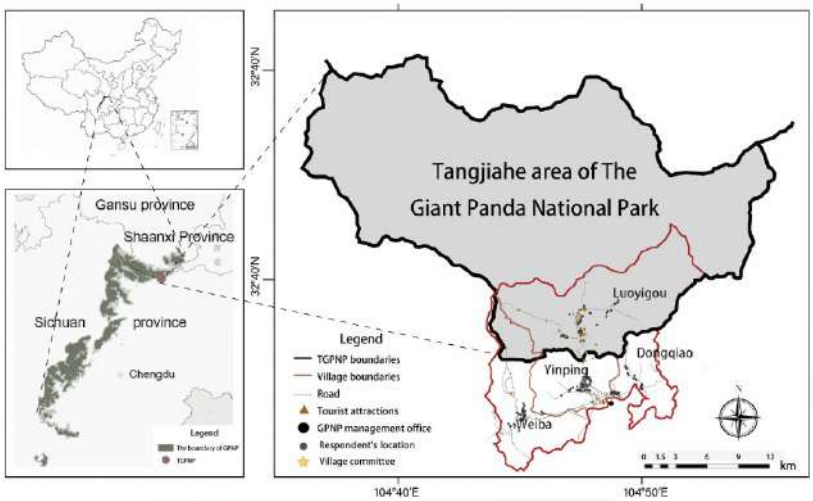
[Background] Social equity is essential in the governance of protected areas (PAs), as ignoring such consideration can lead to resistance and jeopardize conservation objectives. [Objectives] In this way, more research is required to understand the spatial heterogeneity of perceived social equity and its underlying spatial factors. [Method] Using a survey of 361 respondents, we presented spatial distribution patterns of perceived equity by kernel density estimation (KDE) in Giant Panda National Park, China. [Results] The regression analysis showed that local residents who live closer to the PA boundary are more likely to develop negative responses and those who with easy access to tourism spots have more positive procedural and distributional perceptions. Notably, the proximity to the PA authority decreases locals' perceptions of fairness in all aspects, which is potentially due to the opaque participative channels provided by the PA authority. [Conclusions] We argue that those spatial differentials in fairness perceptions are driven by the intrinsic discrepancy of biodiversity protection requirements and the unevenly distributed consequences of management policies. Key steps to advance social equity considerations include multi-industry guidance, extending participative channels, and co-producing better compensation plans. Herein, this study appeals to a greater focus on the spatial aspect of social equity issues in PAs.

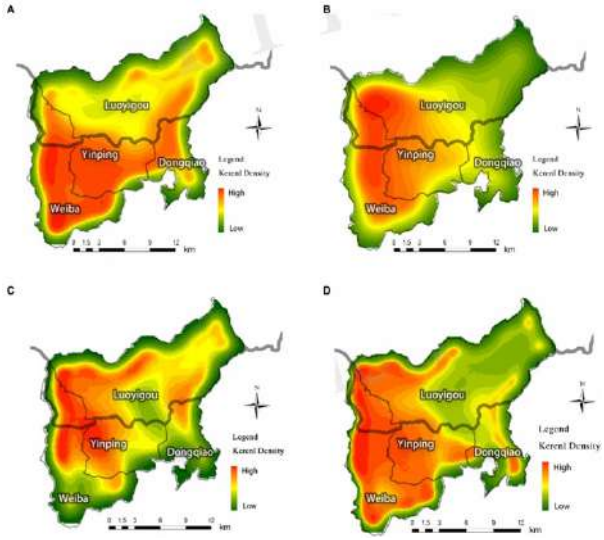
Keywords: protected areas, spatial justice, social equity, fairness perception, spatial accessibility

Map of the Tangjiahe area of the Giant Panda National Park



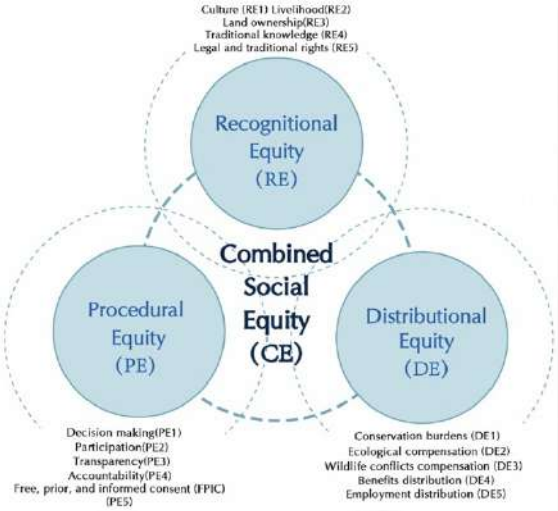
Our research area comprises Luoyigou, Yinping, Weiba, and Dongqiao villages, outlined by red lines.

Spatial distribution patterns of perceived equity across surveyed communities



Recognitional equity (A), procedural equity (B), distributional equity (C), and combined equity (D).

Theoretical framework of social equity in PAs



Indicators refer to the literature of Bennett (2016), Zafra-Calvo et al. (2017), Zafra-Calvo et al. (2019), Dawson et al. (2018), Bennett et al. (2020), and Chen et al. (2022), added to and modified according to the characteristics of Giant Panda National Park

Preliminary results of the impact of spatial factors on perceived equity

		Access to boundary	Access to authority	Access to roads	Access to tourism	LogL	AIC	SC
Combined equity	Prob.	0.000***	0.000***	0.11	0.000***	327.368	−644.735	−622.132
Recognitional equity	Prob.	0.000***	0.043*	0.984	0.398	289.262	−568.521	−545.917
Procedural equity	Prob.	0.06	0.000***	0.07	0.000***	166.789	−323.578	−300.975
Distributional equity	Prob.	0.000***	0.000***	0.314	0.000***	75.133	−140.265	−117.662

*$p<0.05$; ***$p<0.01$.

Basic information on the four selected villages

	Luoyigou village	Yinping village	Weiba village	Dongqiao village
Population (persons)	1,085	1823	1,389	1,160
Number of households (households)	470	642	318	445
Geographical location	Inside PA	Outside PA	Outside PA	Outside PA
Main industry	Farmhouse tourism, planting	Farmhouse tourism, planting	Stone production and processing, planting	Planting
Land area (km2)	62	39.7	22	27.92

Sourced from the National Park Authority

Descriptions of four variables of spatial accessibility

Variable	Description	Measurement method

Accessibility to PA boundary	Distance from household to the nearest PA boundary (m)	Used ArcGis10.2's proximity value to calculate
Accessibility to main roads	Time distance from household to the nearest county-level and township-level road (m)	Used time distance calculation
Accessibility to PA authority	Time distance from household to the ATA (min)	Used time distance calculation
Accessibility to tourism spots	Distance from household to the nearest tourism resources (m)	Calculated by using Euclidean distance

analysis of open-green areas according to universal design principles

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According to the World Health Organization, approximately 16% of the global population consists of individuals from various disability groups. This rate represents 4.8 million people in Türkiye, which is 6.9% of the population. Each individual comprising society has different needs according to their abilities and skills. The Universal Declaration of Human Rights emphasizes that all individuals should have equal rights. In this context, every individual has the right to equal participation and use, from living spaces to social and economic activities. Open and green spaces have various benefits in forming a livable environment and meeting the recreational needs of individuals. These benefits stem from their physical, social, economic, aesthetic, and ecological functions. It has been observed that designs for open and green spaces benefit only a part of society in many parts of our country and in the world. Universal design principles aim to ensure that these benefits affect the whole of society in all areas. Applying universal design principles improves individuals' quality of life and increases the rate of participation in society. It enables everyone to participate fully and effectively in society. Considering different disability groups, the elderly, and children, designs in urban open and green spaces should be inclusive. In line with the spirit of the Universal Declaration of Human Rights, it is important to promote and implement universal design. Thus, everyone will have equal rights in every aspect of life and will be able to live in a manner consistent with human dignity. It is essential to adopt and implement these principles for the welfare of societies and the happiness of individuals.

In this study, Sakarya Millet Bahçesi, Barış Manço Çocuk Parkı, and Çocuk Hakları Sokağı located in the Adapazarı district of Sakarya province were examined within the framework of universal design principles. The study area was evaluated based on three main user profiles: people with disabilities, the elderly, and children. The study area was examined within the framework of 7 Universal Design Principles, their indicators, and the standards obtained through a literature review for these indicators. Based on the findings, recommendations were developed for compliance with principles and standards.

Keywords: Universal Design, Design for All, Quality of Livability

Child-friendly City Steps In Urban Landscape Areas

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Children who grow up integrated into urban life grow up as individuals who are estranged from nature, accustomed to what is readily available, and have not met the soil and other living things. Increasing the awareness of nature, ecology and climate of children, who will be the adults of the future, ensuring that they learn concepts such as waste management, energy efficiency and green technology, and enabling them to examine and practice in areas such as herb gardens, organic farming areas, nature and bird observation areas have great importance for the future of our world. At the same time, these are also important in supporting children's development. Since visiting rural and ecological areas is not a continuous activity for every child, urban landscape areas, which are the daily spaces of children living in urban areas, can be turned into a powerful tool to encourage children's interaction with nature and direct them to environmental awareness.

Urban landscape areas that can serve to strengthen children's ties with nature, should include natural playgrounds, discovery trails, herb gardens, agricultural areas, thematic learning areas, water saving and recycling projects, and bird watching areas, innovative technologies such as solar panels, rainwater collection systems, energy efficient lighting systems. Landscape areas that offer these services that children can easily access in their own neighborhoods, increase the child's awareness of the environment and ecology. In addition, these areas help children to increase their belonging to the neighborhood, to include in society and city life, and to gain a new perspective and behavior. Thanks to applied urban landscape areas, it is possible for children to understand that food does not come from the market, to see that each fruit and vegetable is formed in different periods, to have the ability to produce less waste and recycle his/her waste, to recognize and distinguish the trees, bushes and flowers in his/her garden, to observe the animals living in the city, to perceive concepts such as ecological cycle, habitat and biodiversity and etc. The existence of applied urban landscape areas for children in terms of gaining all these skills and awareness are important areas that host activities that can positively affect the future of the world.

This paper emphasizes the importance of applied urban landscape areas that raise children's environmental awareness, encourage their involvement in social life, make them equal citizens of the city and support their development.

Keywords: Child-friendly City, Raising Children’s Environmental Awareness, Applied Urban Landscape Areas, Social Inclusion, Social Equality

Distribution of Spatial Justice in Galle Face Green, Sri Lanka

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Right to the Landscape is universal disregard of any disparities within a society. Nevertheless, Intensification of socio-economic inequalities has resulted in Injustice within cities. Accordingly, Justice in the contemporary world is grounded to present day unjust conditions and upholds the Right to the city. Justice brought by a spatial dimension has given rise to the theoretical understanding of Spatial Justice as a key component of a Just City. Moreover, The Open Public Spaces contribute to Justice within cities. On the other hand, Spatial Qualities determine the distribution of resources within an Open Public space. Extensively, The study aims to analyze the collective representations of what Spatial Justice is, for the users in the case of Galle Face Green, Colombo, Sri Lanka. Galle Face Green has functioned as a center stage for various civic gatherings. The most recent civic practice was the space becoming an accentuated stage of the People's protest 'Aragalaya'. Accordingly, the study is conducted to determine distribution of Justice in Galle Face Green by overlapping indicators of Spatial Qualities and Spatial Justice. These indicators are analyzed through an integrated Socio-Spatial approach. Each Spatial and Social Sphere separately overlaps indicators of Spatial qualities with factors of Spatial justice on the three spaces covering Galle Face Green. These indicators are scored by the users and analyzed using Standard Deviation and the corresponding zoning Method. Findings of the study revealed that the cohesive Spatial Qualities are significantly related to the favorable factors of Spatial Justice. Moreover, the study also discovered that the influence of Spatial Sphere on Justice was more significant than the Social Sphere. Findings reveal a compatibility relation between indicators of Spatial Qualities & Justice and the distribution pattern of Spatial Justice. The Distribution of Spatial justice in Galle Face Green increase from the central mass towards the border spaces while higher justice being in the promenade edged by the sea. The results suggest ways for Landscape Architects to advocate for the relationship between Open Public Spaces and the ideals of Spatial Justice within a Just city.

Keywords: Spatial Justice, Spatial Qualities, Spatial Sphere, Social Sphere

The representation of women in landscape architecture education

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In many countries, landscape architecture has a long-standing history of being a male-dominated field. This issue extends beyond mere headcounts; even where women make up the majority, leadership positions are often held by men. For instance, among the 11 original founding members of the American Society of Landscape Architects, only one was a woman, namely Beatrix Jones Farrand (ASLA, 2021). In the Landscape Institute in the UK, out of 42 presidents, only four have been women (Landscape Institute, 2018). Despite 66.9% of registered landscape architects in Türkiye being women, only 40% of them own firms (Goktuğ et al, 2011).

This panel investigates the disparities between men and women in The Council of Educators in Landscape Architecture (CELA) in representation, inclusion, and recognition. We pose the question: Are women underrepresented in landscape architecture education worldwide. To answer this question, we established a research collaboration between Florida International University, Clemson University, Auburn University, and the University of Georgia to facilitate conversations and information data sharing. Our research aimed to identify best practices of diversity, equity, and inclusion, and assess how these practices are incorporated in the CELA. The panel interviewed women leaders in the United States within CELA, analyzed historical data identifying women's roles in the CELA and compared that to the number of women award winners and CELA Fellows. For example, a preliminary review of CELA Officers indicates that women held leadership roles 38% of the time and served as CELA Regional Directors 41% since 1989. Similarly, a 2018 study on women in the profession found that 30.4% of firms had female principals in LA firms, and 20% of ASLA Fellows were females (The Women's Landscape Equality (re)Solution).

This panel presentation holds significance for educators in landscape architecture globally as it focuses on the experience and contributions of women in the field of education within landscape architecture. It aims to encourage discussions on the recognition of women in landscape architecture education. Panelists will share findings from data collection and reports, drawing comparisons with the experiences of women worldwide. The presentation will delve into the leadership challenges and successes faced by women in this historically male-dominated profession on a global scale.

Keywords: Women, Representation, Inclusion, Recognition, Diversity

An investigation of spatial inequality in urban greenspace

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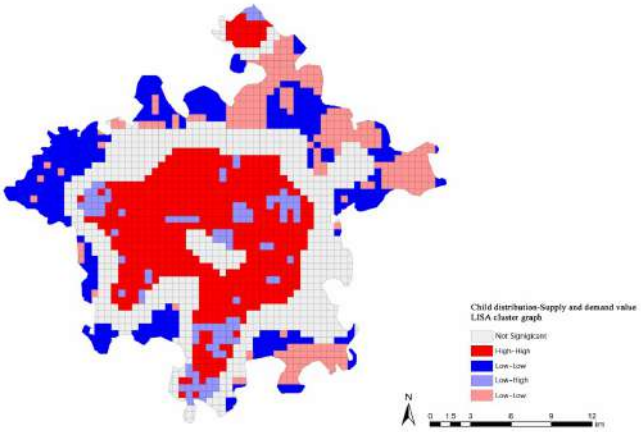
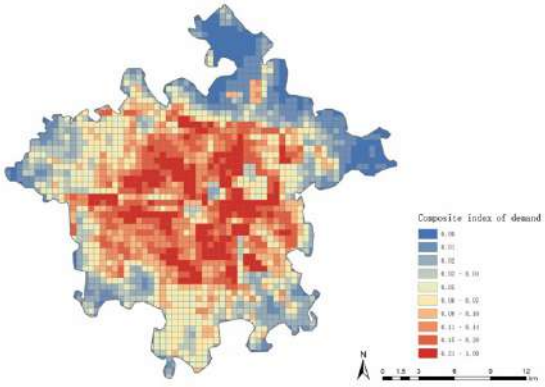
Good use of greenspace can promote urban livability and improve residents' well-being, but with the rapid rise in population density, the mismatch between the supply and demand of greenspace resources and the inequitable allocation of greenspace have become increasingly prominent. Based on 5 districts in the main city of Chengdu, China with high population density, this paper explores the difference of greenspace resource allocation from two aspects of balance and equity. In terms of the balance, the three categories of greenspace, namely park greenspace, road greenspace and community greenspace, are innovatively divided, and the spatial use opportunities of these three categories of greenspace are measured by the improved two-step floating catchment area method and the greenspace rate, so as to characterize the degree of supply. Satellite heat maps with census data to correct the spatial distribution of the population as a measure of demand. Finally, the coupled coordination model and the Z-score standard deviation were used to classify the matching types of supply and demand to comprehensively measure the degree of equilibrium in the spatial allocation of greenspace. In terms of equity, housing price was used to indicate dwellers' socioeconomic status, and the kernel density profiles of POI points that were used more frequently by the elderly and children were used to indicate the spatial distribution of children and elderly. Bivariate Moran's I and multiple regression were adopted to discusses the inequality of greenspace use from economic conditions and age. The results show that: (1) There is a mismatch between supply and demand in the 5 districts of the main city of Chengdu, with 42% of the area in the supply lagging region. (2)The level of supply and demand showed obvious regional heterogeneity, showing a decreasing spatial pattern of "core-edge", and the matching degree of supply and demand in the eastern region was higher than that in the western region. (3)There is a positive spatial correlation between use probability of greenspace and residents' socioeconomic conditions. The communities with higher housing prices also have higher use probability of greenspace(Bivariate Moran's index 0.41>0). (4) Uneven access to greenspace use by different age groups indicates significant inequalities(The Gini coefficient for greenspace use is 0.34 for children and 0.38 for the elderly; 57 percent of areas with high density concentrations of children are located in low level balance zones, and 64 percent for the elderly). The paper bridges the gap between existing studies by revealing differences in spatial allocation of green space through the dual dimensions of equilibrium and equity. This study provides a reference for fine evaluation of high-density urban green space planning and helps to achieve balanced social benefits and high-quality coordinated development of urban park green spaces.

Keywords: Urban greenspace, Greenspace equity, Supply-demand coupling, Coordinated development

Child distribution-Supply and demand value LISA cluster graph

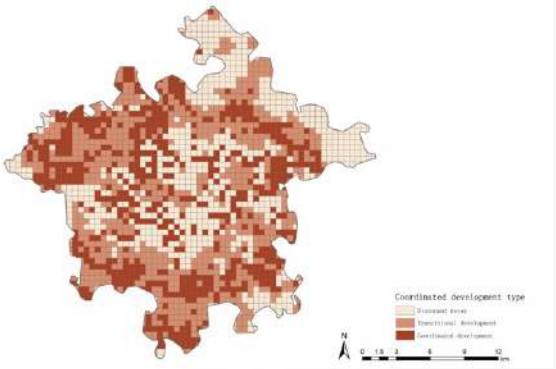


Composite index of demand

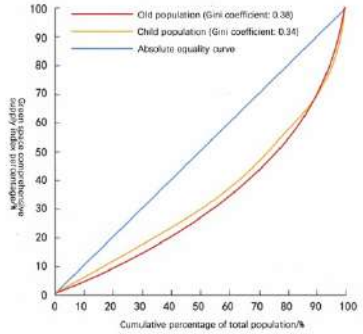


Satellite heat maps with census data to correct the spatial distribution of the population as a measure of demand, and also normalize this data.

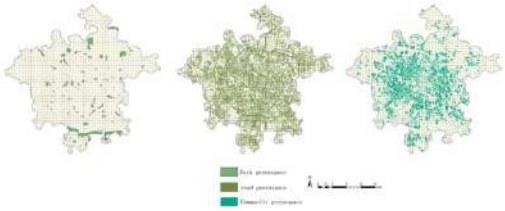
Coordinated development type



Gini coefficient chart

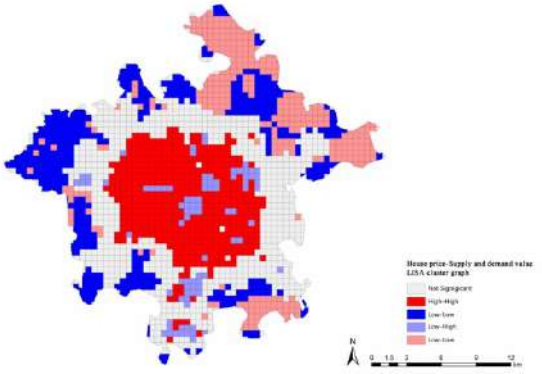


Greenspace distribution map

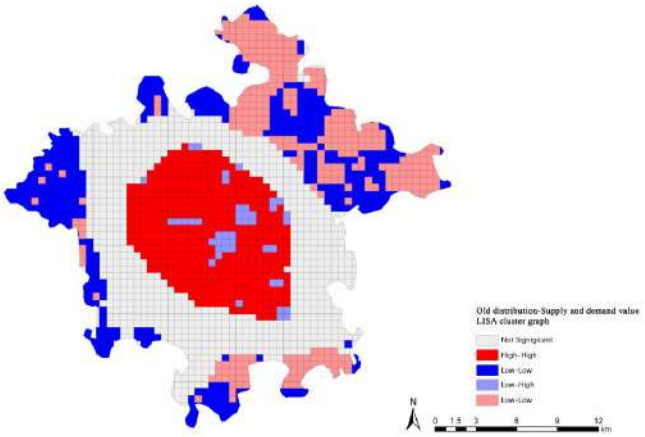


Spatial distribution of three types of greenspace

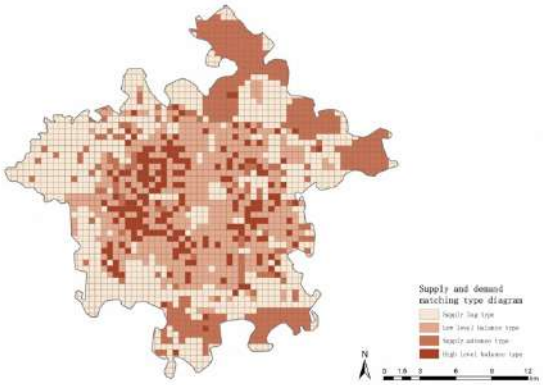
House price-Supply and demand value LISA cluster graph



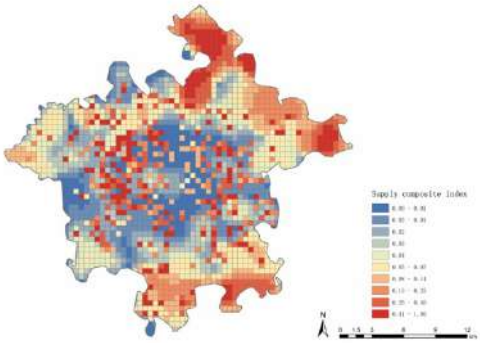
Old distribution-Supply and demand value LISA cluster graph



Supply and demand matching type diagram

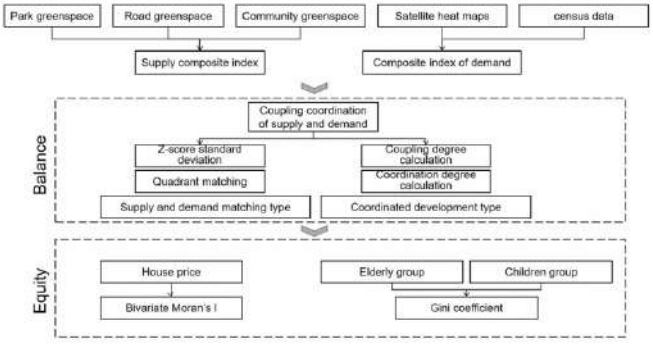


Supply composite index



Spatial use opportunities of these three categories of greenspace measured by the improved two-step floating catchment area method and the greenspace rate, and also normalize this data.

Technical route



Coordinated development type

Coordinated development type	Coordination	Basis of division	Area ratio/%	Summary statistics/%
Dissonant decay	extreme dysregulation	[0.0,0.1)	10.6	/
Dissonant decay	Severe dysregulation	[0.1,0.2)	5.6	/
Dissonant decay	Moderate dysregulation	[0.2,0.3)	6.8	/
Dissonant decay	Mild dysregulation	[0.3,0.4)	15.9	Total of dissonant decay 38.9
Transitional development	Near dysregulation	[0.4,0.5)	13.6	/
Transitional development	Basic coordination	[0.5,0.6)	8.4	Total of transitional development 22
Coordinated development	Primary coordination	[0.6,0.7)	6.1	/
Coordinated development	Intermediate coordination	[0.7,0.8)	16.9	/
Coordinated development	Good coordination	[0.8,0.9)	13.8	/
Coordinated development	extreme coordination	[0.9,1.0)	2.3	Total of coordinated development 39.1

Supply and demand matching type classification

Supply and demand matching type	Basis of delineation	Area proportion
High level balance type	First quadrant	11.5%
Supply advance type	Second quadrant	21.3%
Low level balance type	Third quadrant	29.6%
Supply lag type	Fourth quadrant	37.6%

The Flow of Power: Shifting Socio-Ecological Memory of Alakır River

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Water has been a crucial element in shaping landscapes and cultures throughout history and its management has been a source of power and conflict. Water sources play an active role in power dynamics, shaping unique socio-ecological memories. However, modern approaches to water management can neglect this memory, while a strong socio-ecological consciousness can prevent mismanagement. The Alakır River provides a successful example of reading the power exchange on the water in the context of tension between the modern and the traditional and examining the individual and social conflicts arising from this process. For more than a decade, local communities, NGOs, and environmental groups opposed the construction of a hydroelectric power plant in the Alakır Valley of Antalya's Kumluca district. As a result, the Turkish Supreme Court declared the area as protected due to its exceptional value in terms of freshwater and terrestrial biodiversity, and all hydroelectric projects in the region were halted. This decision represents a significant shift in the power dynamics surrounding water management in the region as it recognizes the importance of community participation in shaping water governance practices. The effects of individual and social landscape consciousness formed around the Alakır River examined through its hermenutical processes. This hermeneutical interpretation uncovers the underlying meaning and values that shape the community engagement process related to water governance decisions in the region. It also reveals how these meanings and values are reflected in the socio-ecological memory of the region and how they shape the perception about its natural resources. The cultural exchanges emerged in this process between the urban and rural shapes into a unique defence mechanism which shows an important example on preserving the landscape memory. The findings of this study will contribute to the understanding of the role of water in shaping landscapes and cultures, and the importance of community participation in water governance practices for preserving socio-ecological memory and cultural and ecological heritage.

Keywords: socio-ecological memory, landscape and power, water management policy

Marginalisation versus mainstreaming: Empowering youth to co-create their space

Nupur Prothi
ICLEI Europe Secretariat

OBJECTIVE: This paper discusses the findings of a project funded by the Stockholm Resilience Centre/ Stockholm University/ Swedbio in India. The project explored the potential of listening to the voice and perspective of the youth on how they perceived the environmental problems of their marginalised neighbourhoods and the solutions they proposed for these. The idea was to empower youth to see and solve these in the short term and voice these to the municipal authorities to find long term solutions for settlements that have fallen off the maps of formal urban planning in the Global South.

Background: While we go about solving the problems related to water, climate, disaster, and pollution, those that are near the brink directly are often left outside these discussions. Whether the process of engaging them is too complicated or they are largely seen as powerless to make a change does not reduce the criticality of their place in discussions on their space. This project was an experiment begun in 2020 (ending 2024) during the covid era to explore the potential of change when youth are empowered and engaged.
This resulted in a publication of short stories written by youth living in a highly compromised urban informal settlement chronicling the acceptance around the environmental pollution and disasters they are faced with. Here began the journey of hope, inspiration and change that we as a group of landscape architects and conservation architects hoped to bring with us to the presentation.
The project is now scaling up to other marginalised settlements through schools and other networks using local culture of storytelling, music and dance to exchange practices around traditional wisdom, understanding local context in construction and spatial planning.
It is also using movies and media to promote the message. The youth are being exposed to traditional building practices, basics of water management and nature based solutions and reuse of waste for co-creating their informal neighbourhoods with short term, simple and do-it-yourself solutions.

This message and change is then being then shared with municipal governance systems through exchange and training modules.

Method: The use of the knowledge repository of training material, comics, stories, teaching modules that were put together for the project both for youth and for municipal officials responsible for change in the urban settlements.
Discussion/conclusions
We hope to spark a discussion on the importance to use landscape architecture as a critical tool for transforming the marginalised neighbourhoods in the cities and towns of the global south using youth as a pivot.

Keywords: youth, water, nature, culture, co-creation

The ASLA Legacy Project for career discovery in landscape architecture

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[1]Florida International University
[2]American Society of Landscape Architects

In the realm of career exploration, landscape architecture often stands as a hidden gem, overshadowed by more traditional disciplines such as architecture and engineering. It remains relatively obscure to many students and parents, often mixed up with landscaping, a field that is perceived as not requiring college education or licensure for practice. Consequently, the journey of career discovery in landscape architecture is characterized by a prolonged path, often stumbled upon accidentally or after pursuing education or practice in other fields. This research investigates the role of project-based volunteer initiatives in exposing students and parents to landscape architecture.

In 2008, the American Society of Landscape Architects (ASLA) introduced the Legacy Project as a gift to the host city where the annual ASLA conference would take place. Each year, the host state chapter of ASLA teams up with the local affiliate of the Architecture, Construction, and Engineering (ACE) Mentor Program of America to recruit local high school students for a design-built landscape architecture community service project. Drawing from the experiences gained through this initiative, our research examines the challenges and opportunities associated with introducing the landscape architecture profession to K-12 students through community service projects. It focuses on the process of identifying stakeholders, bringing community members and industry providers together, navigating building codes and permitting processes, and engaging youth and parents in designing and building landscapes.

The methodology includes an in-depth case study review of built ASLA *Legacy Projects* and interviews with stakeholders. While the case study review provides insights into the process and implementation, stakeholder interviews shed light on challenges and opportunities.

Throughout their academic journey, landscape architecture students engage in hands-on learning experiences, studio projects, and internships to cultivate essential skills and gain practical insights into the profession. These experiences are the distinguishing highlights of the profession and should also serve as a springboard for career exploration, enabling K-12 students to discover the potential paths ahead and the gratification of bridging human and ecological needs.

The landscape architecture profession is poised for continued growth and evolution, driven by the increasing demand for sustainable design solutions and resilient landscapes in the era of Code Red. Career discovery in landscape architecture remains a challenge. By embracing creativity and a commitment to community service and environmental stewardship, the ASLA *Legacy Project* initiative merges advocacy and service, inspiring future generations to join the field.

Keywords: Career discovery, Landscape architecture, ASLA, Legacy Project

ORAL PRESENTATIONS
Engaging with the Digital: Innovation, Technology & Big Data

Engaging with Digital Twin and Landscape Biography: Protecting an Ecosystem

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This paper outlines the progress and learnings resulting from a new innovative project which aims to protect and manage the sustainable development and shift of a coastal ecosystem in South East Ireland, by employing digital twin technology as a platform and repository for relevant existing datasets, whilst being managed and structured around a landscape biography methodological framework.

The project focuses on a protected coastal area in County Waterford as a case study and intends to serve as a blueprint model for replication in comparable coastal ecosystems. The region's delicate ecosystem faces an unparalleled challenge from ongoing climate disruption, increased extreme weather events, rising sea levels and temperatures with the consequent shifts in local biodiversity. This complex scenario is impacted further by a growing local population, together with a focus by local government to establish the area as a premier tourist destination. The area has had varying use over time, including human settlement, a former landfill and a racecourse. Today the tidal lagoon is very popular with walkers, beach fishing and cockle collection.

Funded by the Irish Environmental Protection Agency, this transdisciplinary project entitled "Cúpla Trá" (meaning "Twin Beach or Strand" in Irish), addresses the challenge of competing influences and anthropogenic impact on a landscape by constructing a digital twin platform of the natural environment, which captures the dynamic nature of the region, particularly its sand dune ecosystem. It will incorporate and integrate existing relevant datasets compiled by governing bodies, community grassroots organisations and publicly-funded organisations, together with socio-economic data. This will allow for a predictive analysis of differing levels of influence and impact from these various human and ecological inter-dependent factors, to feed into future policy to ensure responsible and appreciated usage for the region's sustainable development.

The project and requisite datasets are being framed by a landscape biographical approach. This is an integrated transdisciplinary analytical framework used to understand the continuous reciprocal dynamic interaction between the human, non-human and the environment, particularly in regions under threat from change. It is increasingly recognised as a useful collaborative tool between policy makers, planners, landscape architects and the local population to feed into local government planning and tourism policy, particularly in the Netherlands. Shakespeare et al (2022) adapted the approach specific to the Irish context and this project will develop the concept into an eco-centric model.

This is the first time these two approaches have been synergistically integrated to formulate a model that holds promise for replication in other vulnerable coastal regions, fostering pathways toward their sustainable development, particularly by de-centring the anthropogenic element of the ecosystem, and adopting an ecocentric focus. It will establish, better understand and communicate the competing influences, priorities and impact on the region

from the human and more-than-human activity to allow for improved regional planning and infrastructure initiatives.

Keywords: Coastal, Ecosystem, Transdisciplinary, Planning, Innovation

View of Coastal Ecoysystem and town of Tramore

Optimizing Distinctive Pedestrian Spaces in Mountainous City through Big Data

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The unique topography shapes a diverse array of characteristic pedestrian spaces in mountainous cities, serving as integral components not only for residents' daily lives and cultural services but also as crucial elements for showcasing urban aesthetics, possessing significant regional value. However, amidst the backdrop of rapid urbanization and substantial population mobility, these distinctive pedestrian spaces encounter various challenges, including space encroachment, diminished quality, diminished vibrancy, and inadequate pedestrian safety. These issues contribute to a decline in residents' willingness to engage in walking activities. In recent years, the close integration of socio-economic activities and big data has conferred evident advantages in exploring societal behaviors. The rational interpretation of big data contributes to achieving nuanced spatial performance evaluations in a human-centric context.

Despite the widespread application of big data in habitat environment research, its relative scarcity in studies focusing on pedestrian space optimization, especially in the context of characteristic pedestrian spaces in mountainous cities, is noteworthy. Therefore, this study, focusing on the Yuzhong District in Chongqing, aims to conduct a quantitative and qualitative analysis of the actual utilization and behavioral characteristics of individuals in characteristic pedestrian spaces within mountainous urban areas. By combining big data and small data, the study seeks to identify practical demands for various types of characteristic pedestrian spaces and, based on this, propose optimization strategies for such spaces. The core objective is to enhance the human-centric best characteristic pedestrian spaces in mountainous cities, thereby comprehensively elevating the public walking experience.

The research process comprises three key steps. Firstly, through the extraction of points of interest from online maps and on-site field investigations, characteristic pedestrian space distribution and types in the study area are identified, including stepped pedestrian space, cliff-side pedestrian spaces, pedestrian spaces integrated with architecture, under-bridge pedestrian spaces, riverside pedestrian spaces, regional cultural pedestrian spaces, and mountain forest pedestrian spaces. Secondly, by integrating textual big data from social media and small data obtained from crowd surveys, the study assesses public evaluations of various types of characteristic pedestrian spaces, analyzes public actual demands, and delineates relevant evaluation factors. Lastly, appropriate evaluation criteria are chosen, and the Analytic Hierarchy Process is employed to construct an evaluation system aligned with public demands. Based on multi-level analysis results, strategies and recommendations for optimizing characteristic pedestrian spaces in mountainous cities are proposed to provide a higher-quality walking experience. This study aims to offer bottom-up scientific support for future updates and optimizations of characteristic pedestrian spaces in mountainous cities, ensuring alignment with practical usage needs.

Keywords: Big Data, Mountainous City, Pedestrian Spaces

Assessing and Interpreting Perceived Park Quality from Social Media Data

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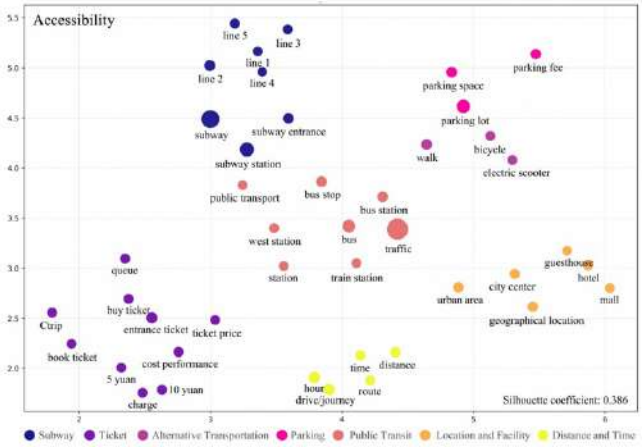
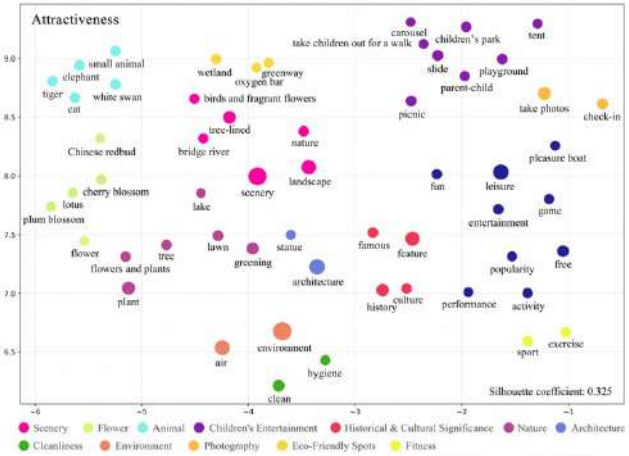
Urban Green Spaces (UGS) are crucial to urban ecosystems, and understanding public perception is key to their effective management. While conventional survey methods are resource-intensive, Social Media Data (SMD) offers a cost-effective alternative to gathering public insights. However, current explorations into SMD's potential in assessing UGS face challenges, particularly in integrating text and image analysis and effectively filtering out irrelevant content to identify influencing factors of different dimensions. Based on a manually curated dataset, this study introduces the Park Dual-modal Perception (PDP) model, a cutting-edge approach combining SMD text and image analysis for evaluating perceived park accessibility, usability, and attractiveness, with an average accuracy of 86.81%. Utilizing SMD from 130 parks in Guangzhou, the model effectively quantifies the three dimensions, generating visualized scoring maps to aid planners in identifying parks with lower perceived scores on the urban scale. Further incorporation of SHapley Additive exPlanations (SHAP) within the PDP model can filter 82.79% irrelevant words and effectively extract 158 thematic words and 954 associated words, providing suggestions for park-level enhancement. Our findings indicate that (1) factors such as distance, travel time, ticket prices, and proximity to commercial amenities are pivotal in determining park accessibility. (2) Park usability hinges on park's ability to serve diverse groups and provide well-maintained, multifunctional facilities. (3) Park attractiveness is closely linked with the cultural and regulatory characteristics of ecosystem services. Our methodology combines assessment and interpretation of human perception at both city and park scales. It aids city decision-makers in identifying low-quality parks and understanding the underlying reasons, thereby facilitating more informed urban planning decisions.

Keywords: Urban green space, Public perception, Natural language processing, Computer vision, Social media data

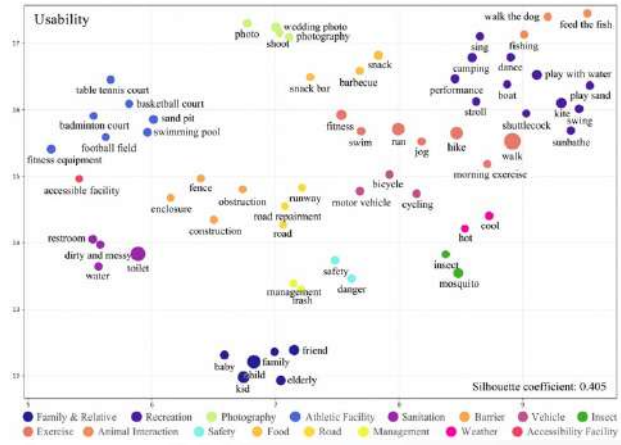
Clusters related to park accessibility



Clusters related to park attractiveness



Clusters related to park usability

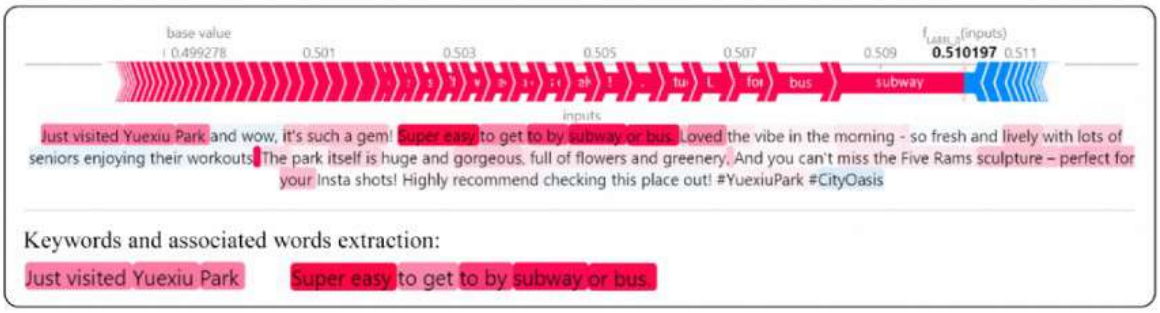


Example of SHAP-based keyword extraction results

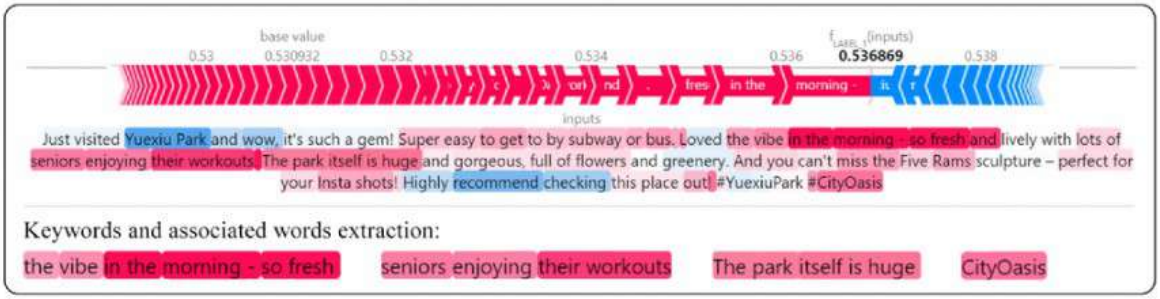
a) Sample park review comment

> Just visited Yuexiu Park and wow, it's such a gem! Super easy to get to by subway or bus. Loved the vibe in the morning - so fresh and lively with lots of seniors enjoying their workouts. The park itself is huge and gorgeous, full of flowers and greenery. And you can't miss the Five Rams sculpture – perfect for your Insta shots! Highly recommend checking this place out! #YuexiuPark #CityOasis

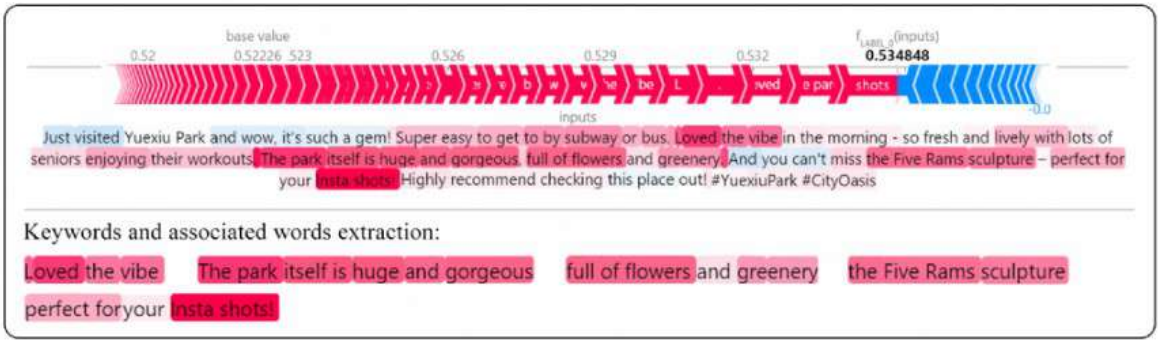
b) SHAP-based keywords extraction results of accessibility



c) SHAP-based keywords extraction results of usability

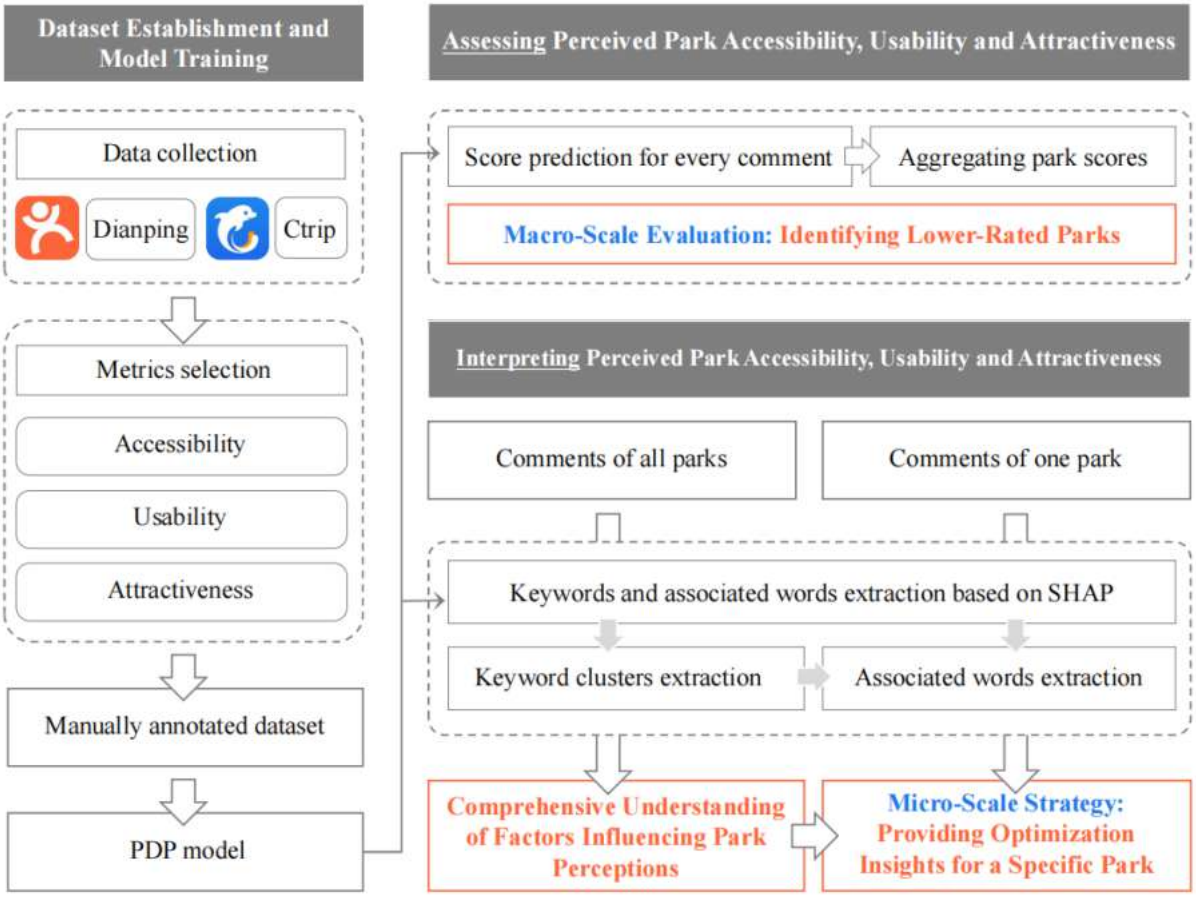


d) SHAP-based keywords extraction results of attractiveness



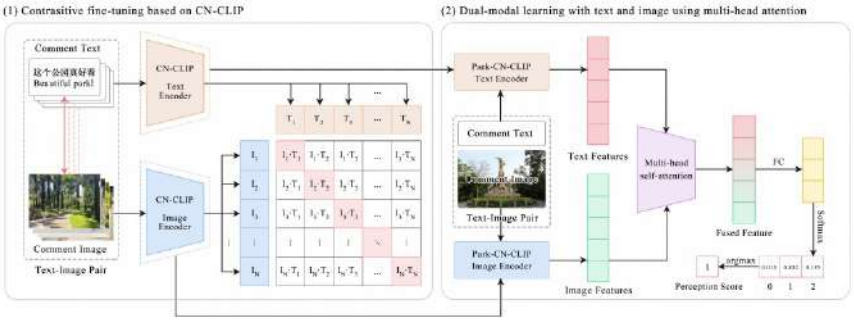
Although comments often contain multiple layers of information, our SHAP-based method is adept at extracting dimension-specific information. For instance, when assessing accessibility, the model focuses on phrases like "super easy to get to by subway or bus" in the example comment, while assigning lower SHAP values to characters irrelevant to accessibility, thereby reducing their emphasis.

Research framework



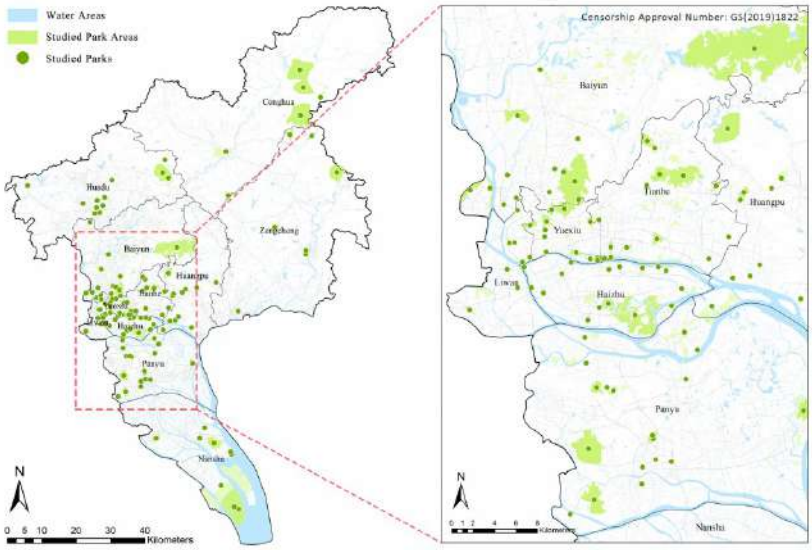
We manually established a dataset comprising comments along with their corresponding labels on accessibility, usability, and attractiveness. Then based on the CN-CLIP model, we developed an innovative Park Dual-modal Perception (PDP) model that simultaneously processes SMD text and image data. The PDP model serves to assess and interpret public perception as reflected in the SMD. In the assessment section, it can quantify public perception scores across the three dimensions. Further, through the incorporation of SHAP within the PDP model, it can filter out irrelevant content and precisely identify factors contributing to score variations, providing strategic suggestions for micro-scale enhancements.

Structure of the PDP model



The development of our Park Dual-modal Perception (PDP) model is inspired by the latest advancements in unsupervised pre-training methods, particularly OpenAI's Contrastive Language-Image Pre-Training (CLIP) (Kaplan, McCandlish et al. 2020). CLIP employs contrastive learning on an extensive corpus of 400 million internet-derived image-text pairs. This method not only effectively aligns text with corresponding image features but also demonstrates exceptional adaptability, delivering state-of-the-art performance in zero-shot image classification tasks across diverse datasets.

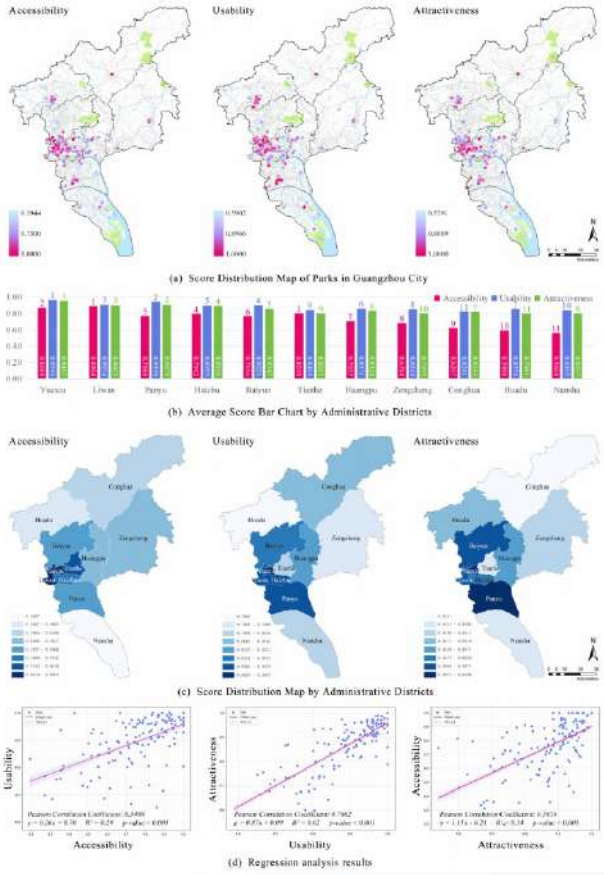
Study area and geographical spatial distribution of our studied parks



Our data collection encompassed 387 established parks in Guangzhou, with Python used to access the APIs of the selected SMD platforms. The collection included all comments available up to August 1, 2023. To guarantee adequate data samples for each park, only those with over 30 combined comments on both platforms were considered. This criterion was met by 130 parks (Fig. 2). Following data cleaning to exclude blank, irrelevant, and duplicate comments, a total of 62,106 valid comments and 111,488 images were obtained. Each comment record includes the username, comment timestamp, comment texts, and any associated images.

Terms associated with accessibility

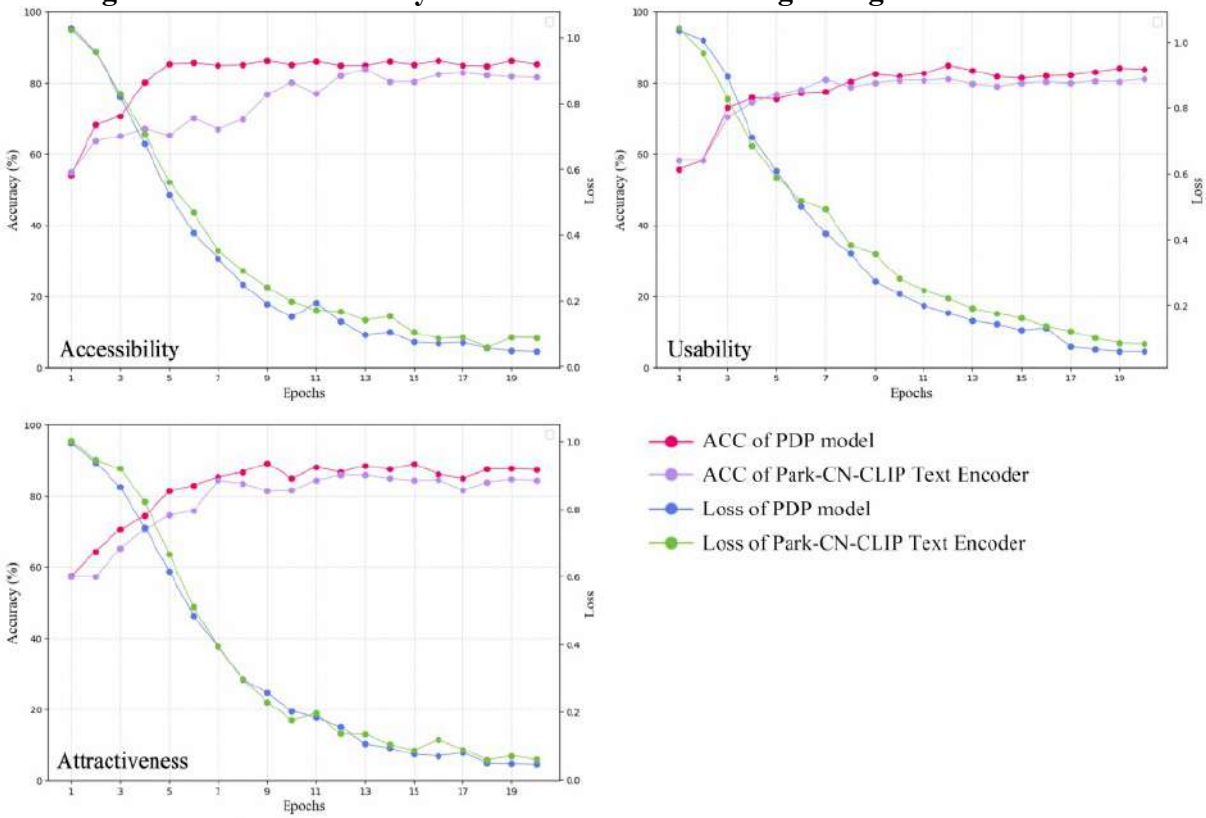
The measurement results within the case study area. (a) Aggregating score for every park. (b, c) Average scores by administrative district. (d) Regression analysis results.



Each comment of the 62,106 comments obtained was scored from the three dimensions. Among these, 13,329 comments (21.5%) were not labeled as "2" (not relevant), indicating that they related to perceptions of accessibility. Specifically, 3,667 comments were labeled as

"0" (negative), and 9,662 as "1" (positive), suggesting that 72.49% of comments positively reflected park accessibility. The high variance (0.0361) and a considerable proportion of negative comments (27.51%) on accessibility indicate varied accessibility quality across parks.

Training curves of the accuracy and loss on the test set regarding 2 models



The experimental results, illustrated by the training curve in Fig. 4, showcase the efficacy of our PDP model. The model demonstrated high prediction accuracies, achieving 0.8628 for accessibility, 0.8489 for usability, and 0.8926 for attractiveness. These accuracy levels notably exceed those achieved by solely using the Park-CN-CLIP's text or image encoders and surpass the BERT model's performance by 3.17%, 7.19%, and 14.43%, respectively. Impressively, the prediction accuracy of the Park-CN-CLIP Text Encoder outperformed the widely utilized BERT model by margins of 0.98%, 4.41%, and 11.85%.

Smart Cities in Africa; A case of Konza Technopolis, Kenya

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Smart Cities have been viewed as 'economic island zones' designed exclusively for a particular social class. This prevents some groups of people, particularly local indigenous communities, from accessing and having a sense of belonging in these mega projects, especially in Africa. Exclusion in smart cities also extends beyond the city boundaries through gentrification. This disrupts social networks and cultural ties by pushing local communities away as the property value rises. The United Nations Development Program has over time emphasized on the need for community involvement in development projects. It stresses that the adoption of top-down model of developing cities does not take advantage of the local knowledge and resources, therefore limits community ownership of these cities. This research aims at the transformation of proposed smart cities in the African context by making them more inclusive given the unique and diverse socio-economic and cultural orientation of the African people. The project will heavily rely on case studies and primary data collected from lead technology providers and local communities within the upcoming Konza Technopolis City in Kenya. By tapping into areas of cutting-edge technologies such as artificial intelligence, this research will create a framework to make African smart cities more economically, technologically, socially, culturally and linguistically friendly, thereby improving the quality of life and making the inhabitants more citizen-centric. With a specific focus on the application of artificial intelligence, the research will demonstrate how key aspects of artificial intelligence are vital in building smart and inclusive cities. This is through facilitating accessibility by minority population and disadvantaged people especially those living with disabilities, designing personalized and need-based facilities using artificial intelligence algorithms, designing local and international language translation systems, and empowering local communities by making the technology more user friendly. The overall goal of the research is therefore to open up these cities to more opportunities by maintaining the touch of the diverse African culture and changing people's perception of smart cities to that of being part of a 'larger ecosystem'.

Keywords: Inclusivity, Artificial Intelligence, Smart Cities, Local Communities

Ecodesk: Digital Green Infrastructure Planning Tool for Jiangnan Water Villages

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[2]Shanghai Ecodesk Ecological Technology Co., Ltd., Shanghai, China

The Jiangnan water villages in southern China exhibit a unique landscape pattern that integrates agricultural life, cultural production, and local natural system characteristics. Influenced by the high development and expansion of urban clusters in the region, the current water villages consist of a highly dynamic and fragmented complex, comprising declining natural landscapes, disappearing historical and cultural landscapes, and a mix of industrial and urban elements. The traditional Rural Green Infrastructure (RGI) in the water villages is mainly composed of farmland, forests, and water networks. However, it faces challenges from the impact of new settlements, new agricultural lands (such as ponds, orchards, and plantations), and urban and industrial elements in modern cityscapes.

To restore the original landscape pattern of the water villages, the government has undertaken various initiatives focused on the restoration and enhancement of RGI. Government-led practices include comprehensive land consolidation, ecological restoration projects, watershed management, community environmental improvement, etc. The unique aspect of these practices lies in the balancing of Ecosystem Services (ESs) at regional, village, and project scales. The challenges for RGI include precise mapping and efficient restoration in the complex coupled state of ecological and human environments, integration of key objects from multiple professions (such as water resources, soil, environment, ecology), and quantifying the investment and ESs output under diverse social investments.

Based on the supply, regulation, culture, and support of ESs balancing model, the "Ecodesk" RGI digital planning tool has been developed. "Ecodesk" addresses the issue of balancing ecosystem services at multiple scales and proposes a systematic workflow for RGI planning: precise identification and dynamic mapping of ESs, planning and governance decision optimization tools, and value assessment using digital twin technology throughout the process. The RGI planning toolkit includes evaluation tools for greenhouse gas emissions, biodiversity, ecological and physical environment, social service value, and green economic value."Ecodesk" achieves systematic ecological information collection, database structure, data analysis platform, and develops "data flow" rules for ecological digital tools. It serves in the early assessment on site selection, precise identification of ecological technology in planning and design, and post-construction evaluation and long-term monitoring.

The "Ecodesk" system has been analyzed and evaluated in typical RGI scenarios in Shuiku Village and Beiguan Village in Shanghai. It accurately assesses the degree of ecosystem service balancing in RGI construction practices. Through the comparative evaluation of different planning schemes, the accuracy and reliability of RGI construction have been improved, reducing secondary damage to the ecosystem. It provides transparent data monitoring and fair management means for RGI projects, responding effectively to topics in the United Nations Sustainable Development Goals (SDGs) such as good health and well-being, clean water and sanitation, reduced inequalities, climate action, and sustainable cities

and communities. This digitized approach creates a new professional role in landscape architecture that can lead interdisciplinary collaboration, providing innovative method and workflows for RGI within the framework of SDGs.

Keywords: Jiangnan water villages, rural green infrastructure, ecosystem services trade-off, ecodesk digital tool

Deciphering Anthropogenic Influences on Habitats: Implications from Interpretable Machine Learning

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Constraining human activities that pose threats to ecosystems constitutes a crucial goal in the planning and management of natural reserves, which is essential for preserving the integrity of ecosystems and fostering biodiversity. The influence of anthropogenic factors often manifests as a radical diffusion, emanating progressively from the core of human activities and exerting extensive and far-reaching impacts on ecosystems and species. Nevertheless, contemporary ecological researches and practices within natural reserves have not fully grasped nor assessed the radiating effects of anthropogenic factors.

Our study proposed an approach based on multi-source big data and interpretable machine learning to identify and understand the mechanisms through which human-related factors affected the habitats of species. The study area encompasses 41 counties (cities, districts) in Sichuan Province, where giant panda habitats (GPHs) or potential habitats are distributed. The study precision was set at 1 kilometer. After comparing the performance of different machine learning algorithms, the Random Forest algorithm was employed to construct a distribution model for GPHs, utilizing species distribution data from existing surveys and predictor variables that integrate both environmental and anthropogenic factors. Subsequently, interpretability methods such as partial dependence plots (PDPs) and the Shapley Additive exPlanations (SHAP) were employed to uncover the impact of all factors on the model's outcomes, revealing the complex nonlinear relationships between anthropogenic factors and the distribution of GPHs. By examining one-way PDPs, we can discern the impact of a specific factor on GPH distribution. Meanwhile, generating two-way PDPs enables us to illustrate the combined influence of two factors on GPH distribution. The explication yielded by machine learning interpretability aids in discerning spatial areas of GPH influenced by anthropogenic factors.

Our main findings and their applications include: (1) Within the 5km range near the human settlements, the probability of the distribution of GPHs is minimal, while beyond 5km, the likelihood gradually increases with distance. (2) Different levels of transportation infrastructure exhibited varying degrees of disturbance to GPHs, with the distances to railways and metros and the distance to motorways being the two most critical anthropogenic factors influencing GPH distribution. Both national and provincial roads, as well as city arterial roads, negatively impacted GPHs, and this influence may extend beyond 10km. (3) The central urban area of Dujiangyan City is relatively close to the GPHs, and some rural settlements have already been located within the GPHs, making it one of the most prominent cities (counties, districts) with ecological issues in the study area. Based on the derived thresholds for anthropogenic influences, we proposed strategic recommendations for the natural reserve planning and management of Dujiangyan City.

This study employed interpretable machine learning methods to confirm the impact of population distribution, human settlements, and transportation infrastructure represented by

national and provincial roads and city arterial roads on GPHs. Furthermore, it confirmed the presence of marginal effects in these influences. Our findings not only offer guidance for the effective conservation of GPHs but also provide insights applicable to the planning and management of other natural reserves.

Keywords: Natural reserves, Human activities, Giant panda habitat, Interpretable machine learning, Random Forest algorithm

Emerging trends in the digital revolution in landscape planning

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There is a strong consensus across the literature on mega-trends and the importance of digital technologies in supporting planning systems. The contemporary challenges of gradual adaptation to climate change require new tools and frameworks. Technological innovations offer new techniques supporting the effective link between knowledge-building during research, synthesis, ideation, and decision-making. Nevertheless, due to the plethora of digital solutions available, we experience a delay between data and knowledge processing; the digital technology to capture, retrieve, and reproduce data exceeds the human ability to use it effectively.

Digital technologies have become indispensable, reshaping how designers, planners, and policymakers approach the intricate task of creating sustainable and resilient environments. Geographic Information Systems (GIS), remote sensing, 3d Modeling, and CAD are already well integrated into landscape planning practice. However, the digital revolution we are witnessing encompasses a broader set of tools, devices, and resources that have not yet been fully incorporated into the landscape planning process.

Through a scoping review of more than 50000 publications from the last decade, we identified 35 different technologies that gather, process, analyze, and monitor data on environmental conditions, allowing planners to respond to changes proactively and ensure the long-term health and functionality of landscapes. We analyzed the emerging trends and dominant correlations. We identified a dichotomy between technology innovations and their actual planning applications. Insights from our research can serve the planning-related disciplines to participate in the broader discussion to shape the direction of technology development for the benefit of society, and it calls for closer cooperation between LP practitioners, researchers, and IT specialists.

Keywords: scoping review, digital technologies, landscape planning, urban planning

Incorporating Human Perception in Digital Twins for Sustainable City Development

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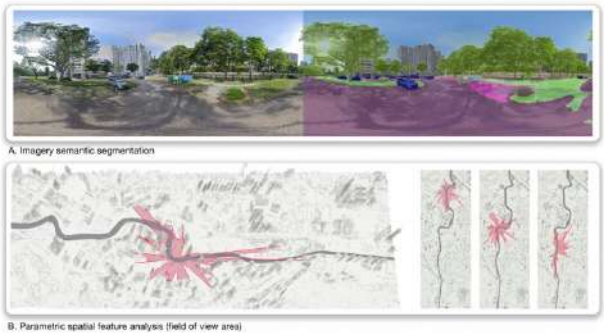
Urban digital twins (UDTs), mirroring not only the physical environment but also intricate urban dynamics, may provide valuable insights for planners by predicting and analyzing the impacts of urban scenarios. Sustainable urban environments have become a global priority among governments, and the UDT technology is considered a pivotal pathway towards achieving this shared objective. One of the main goals of planners is to develop scenarios that are pleasant and sustainable, and citizen's subjective visual perception and objective evaluation of the built environment play a pivotal role in this process. However, there is a lack of research on connecting with the public through UDTs for environmental perceptions, and no existing UDT framework is suitable for analyzing visual features of urbanscapes and automatically predicting perceptions associated with photo-realistic rendering scenarios. To fill the gap, our study developed and implemented a novel UDT framework that is suitable for objective feature evaluation, subjective visual perception, and perception prediction of simulated scenarios. Objective feature analysis incorporates algorithms, such as computer vision, into the framework, to quantify a series of visual features in the built environment. Subjective visual perceptions (e.g.\ safety and lively) are captured using immersive virtual reality to gather public perceptions of different scenarios and learn patterns. Further, utilizing a photo-realistic rendering engine, high-quality renderings of textures and materials for UDT were achieved, and we proved their veracity based on a perception experiment. Afterwards, we employ the random forest algorithm for automated perception predictions of rendering scenarios. The implementation was demonstrated with a case study on an urban greenway in the central area of Singapore. We compared both the objective evaluation and subjective perception results, followed by a demonstration of automated visual perception prediction through photo-realistic scenario simulations, such as modifying vegetation density or introducing new architectural elements to the skyline, to predict the perception of scenarios before they are built, leading to more efficient and automated urban planning. The UDT framework we constructed could support the built environment's betterment and interactivity in participatory planning.

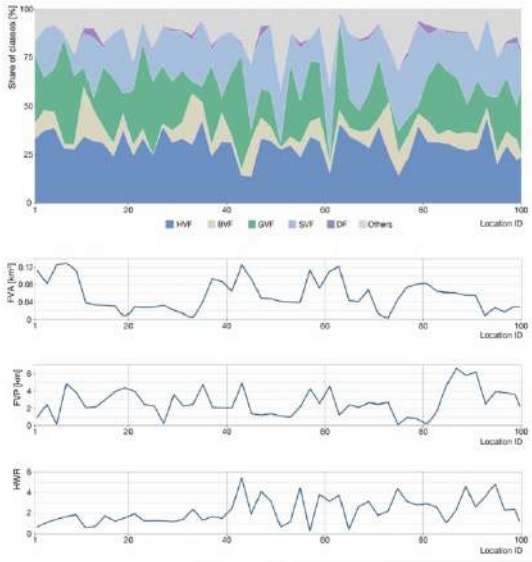
Keywords: Urban digital twin, Semantic segmentation, Virtual reality, Visual perception, GeoAI

Key features of the virtual counterpart of the study area in the UDT framework. In this research, we demonstrate that renders from 3D models give the same visual impression in surveys, confirming the value of photorealistic renderings of scenarios th

Semantic segmentation of the collected panoramic imagery and parametric spatial analysis out- comes.



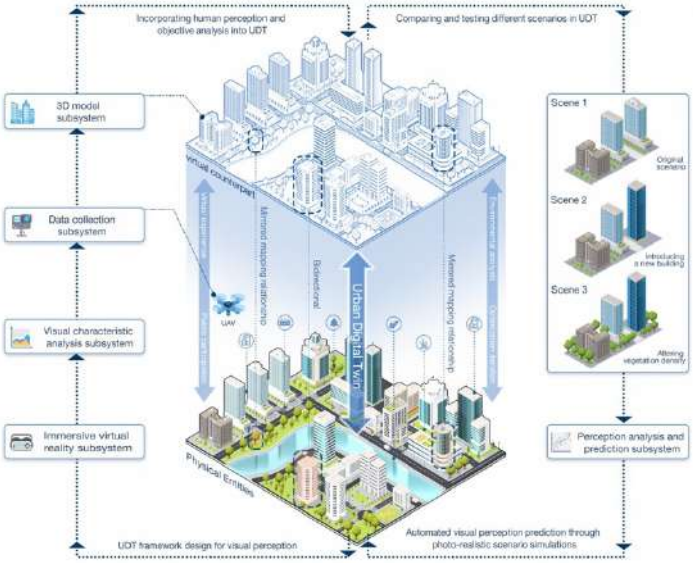
Spatial variation characteristics of objective indicators



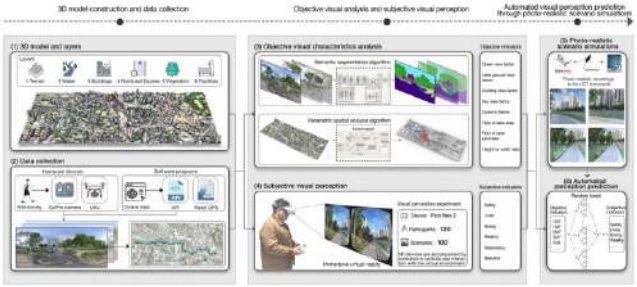
Study area and survey points with numerical labels. Field panoramic photographs of the

two selected mapping points show the surveyed landscapes. (Source of the base map: Google.)

The urban digital twin framework we developed for assessing and managing visual perception in the built environment.



Workflow of this study.



Augmented Reality and Resident Engagement in Restorative Environments Design

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This study aims to evaluate the application of Augmented Reality (AR) technology and resident participatory design methods in urban restorative environments, and their impact on residents' psychological well-being and social interaction. Utilized a mixed-method research design, this study initially employed resident participatory workshops to collect preferences for restorative environmental design elements. Subsequently, prototypes based on AR technology were implemented in selected urban spaces for restorative environmental design. The study adopted a randomized controlled experimental design, and divided participants into an AR restorative environment group and a non-AR control environment group, with data collected through questionnaires during the experiment to assess the impact of AR restorative environments on residents' psychological well-being and social interaction. Additionally, focus group discussions were organized to gain deeper insights into residents' experiences and the potential value of AR in restorative environments. The results confirm that combining AR technology with resident participatory design methods can effectively enhance the design and implementation of urban restorative environments, thereby improving residents' psychological health and social interaction. The resident participatory design process can promote social cohesion and active participation among residents. AR technology can enhance the perception and participation in natural environments, increasing residents' sense of identity and belonging to urban spaces. This research provides a new pathway for urban planners and designers to create highly participatory and restorative urban spaces using AR technology.

Keywords: augmented reality, restorative environments, community engagement, urban design, health

City-scale Green Infrastructure Multi-objective Optimization based on Interpretable Machine Learning

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Green infrastructure (GI) represents a pivotal strategy for alleviating urban waterlogging risks, an issue increasingly pressuring traditional gray infrastructure (GrI) in urban areas globally. While machine learning (ML) models are prevalent for simulating urban waterlogging scenarios, their capacity to support quantitative planning of GI at an urban scale remains limited. This study introduces an innovative approach by integrating an interpretable machine learning model, utilizing support vector machines (SVM) combined with Shapley additive explanations (SHAP), with the non-dominated sorting genetic algorithm-II (NSGA-II). This amalgamation creates a robust model for urban waterlogging susceptibility mapping, mechanism elucidation, and the identification of optimal GI planning in terms of location and scale at the city level.
Applying this model to central Beijing, we aimed to assess urban waterlogging susceptibility, uncover the underlying dynamics, and determine the most effective GI spatial and scale configurations. Our findings reveal a marked polarization in waterlogging susceptibility within central Beijing, with 42.3295% of analyzed units facing severe waterlogging risks, predominantly clustered in the urban-rural transition zone. The SHAP analysis underscored the critical roles of both GI and GrI in mitigating waterlogging, highlighting a synergistic relationship between them. Notably, the analysis suggested that the strain on GrI would significantly escalate should the GI proportion fall below 0.452.

The study proposes a 3.206% increase in GI, strategically distributed across vulnerable areas, as an optimal strategy considering investment efficiency. Specifically, the southwest suburbs emerged as key areas requiring urgent GI expansion to address existing deficits. Beyond augmenting GI, the research advocates for complementary strategies to enhance GrI optimization and GI runoff management efficiency, given the premium on land within the study locale.

Our research offers a novel tool for guiding urban waterlogging mitigation strategies and serves as a valuable reference for GI planning in central Beijing. By doing so, it contributes to fulfilling the contemporary demands of urban ecological development. This interdisciplinary approach not only provides a detailed analysis of waterlogging risks and GI effectiveness but also exemplifies how advanced machine learning techniques can be harnessed to improve urban infrastructure planning. Through the strategic application of GI, cities can mitigate waterlogging risks, thereby enhancing urban resilience and sustainability. This study underscores the necessity of integrating technological innovations with urban planning to address complex environmental challenges, setting a precedent for future research and implementation in urban ecological construction and waterlogging risk management.

Keywords: green infrastructure, urban waterlogging, support vector machines (SVM), Shapley additive explanations (SHAP)

Intergrating VGI and SVI data in designing exercise-friendly blue spaces

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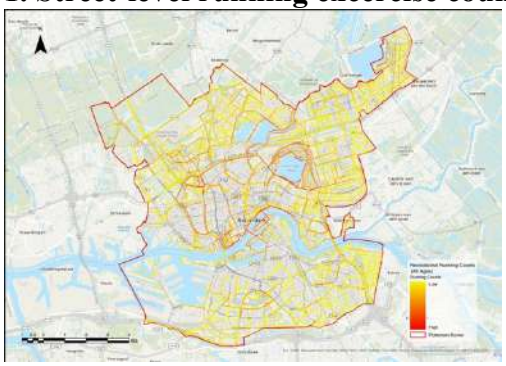
As urban populations continue to grow, global concerns about health issues related to chronic lifestyle diseases are increasing. Research suggests that exposure to natural environments in urban settings can improve human health and well-being, particularly by attracting individuals to engage in exercise, thereby promoting health. On the other hand, the importance of blue space is overlooked compared to green space. Therefore, urban planning and design should be responsible for creating exercise-friendly blue spaces to promote human health. However, a primary challenge in realising this objective lies in the absence of evidence and methodological support to bridge the gap between public health experts and planners/designers. To tackle this issue, this study integrates volunteered geographic information (VGI) and street view image (SVI) data, establishing a methodological framework. This framework first aims to investigate the evidence on the associations between blue space environments and exercise behaviour, then translate the resultant evidence into actionable design knowledge for direct application in spatial planning and design.

The city of Rotterdam is used as an example to validate the feasibility of the methodological framework. Given its substantial expertise in water management and abundant blue space resources, research in Rotterdam can serve as a benchmark for developing exercise-supportive waterfronts and blue spaces in other urban areas. Specifically, the methodological framework consists of five steps. First, street-level exercise counts are obtained from the VGI data platform. Second, the SVI data at the street level is collected through the combination of Google Street View and Python script. Next, the eye-level environmental features of blue spaces based on SVI data are calculated by using deep learning techniques. Fourth, the associations between various environmental features of blue spaces and exercise counts are explored based on multiple statistical models. Last, the tailored design knowledge (i.e. spatial principles and patterns) is translated from the analysis results for designing exercise-supportive and health-promoting blue spaces. The study results could assist planners and designers in incorporating the health benefits of exercises into the spatial planning and design of blue spaces. On the other hand, the methodological framework could serve as an inspiration for other researchers and practitioners to realise the potential of emerging techniques and extend it to additional locations for the purpose of developing healthy cities.

Keywords: Volunteered geographic information, Street view images, Deep learning, Excercise-friendly blue space design, Evidence translation

1. Street-level running excercise counts of Rotterdam based on VGI data



2. Eye-level greenery of blue spaces based on SVI data

Refining urban perception measurement through on-site questionnaires and streetscape data

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Accurate and efficient measurement of urban perception has long been challenging for researchers. Although traditional methods involving interviews and questionnaires are known to provide detailed measurements, they are undeniably laborious and time-consuming. Recent studies have employed Machine Learning (ML) algorithms to evaluate urban perception from urban big data such as Street View Images (SVIs). This approach significantly enhances efficiency and broadens the scale of research. However, these algorithms are often based on ratings of SVIs, extracting urban perception solely from visual traits, thus tend to neglect other complex contextual aspects within real spaces. In this study, we chose Beijing's Old City (BOC) as an example to explore the correlations between street spaces and perceptions. Building upon this investigation, we proposed an improved ML approach to better model and predict urban perception.

To propose a refined model, it is essential to comprehensively and precisely represent both street spaces and perceptions. Firstly, we established an indicator system based on the 5Ds framework, encompassing Density (POI, junction, and building density), Diversity (POI and image entropy), Design (imageability, enclosure, greenness, openness, pavement, safety, facility, and culture), Destination accessibility, and Distance to transit. The indicators were extracted from both multi-source geo-information and panoramic SVIs collected in BOC, utilizing ArcGIS Pro 3.2 and a pre-trained deep-learning model DeepLabV3+. Secondly, we collected perception data of four aspects (safety, vitality, aesthetics, and restoration) from over 1500 public participants through on-site questionnaires facilitated by a Public Participation GIS (PPGIS) platform called PinSurvey. Next, Pearson correlation analyses were conducted to identify the main indicators affecting perceptions. Finally, we trained four distinct ML models based on the various main indicators identified in the correlation analyses to predict the four aspects of perception. Our best model achieved an accuracy of over 90% in predicting the perception of the street within BOC. The study revealed significant insights into urban perception: 1) Density indicators reflecting urbanization levels are positively correlated with vitality but negatively with restoration. 2) Design and Diversity indicators strongly correlate with various perceptual aspects, indicating urban design’s essential role in shaping urban perceptions. 3) Aesthetics emerged as the most challenging aspect to predict, due to its subjective and vague nature. Additionally, we distilled patterns observed in streets with high perception scores, providing valuable insights for planning and design practices.

In conclusion, this study integrated physical features and on-site questionnaires to develop a comprehensive analytical framework for understanding urban perception and explored the dynamic interplay between humans and the urban environment of BOC. The findings offer the potential to refine the precision of urban perception measurement. We believe that this elaborate approach provides a valuable model for depicting nuanced streetscape perception, analyzing the multifaceted urban landscape, and offering insights for sustainable urban design and planning.

Keywords: human perception, big data, PPGIS, machine learning, sustainable urbanism

Virtual Realities for Actor Sensibilization: Landscape Planning in Fortaleza, Brazil

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The prevailing climate crisis presents fresh hurdles for designers. According to the IPCC (2023), temperatures likely increased between 0.8°C and 1.3°C due to human-induced factors from 2010 to 2019. Within landscape architecture, urban planning has embraced intricate design tools, notably XR technology, but these innovations are underutilized in engaging communities in the design process. Failure to reform urban planning approaches could jeopardize the lives of over 68% of the global population by 2050 (UN, 2022). In Brazil, these challenges are exacerbated, leading to annual flooding catastrophes and significant loss of life (The Guardian, 2023). Vulnerable communities, often the most affected, raise pressing questions: How can an inclusive and safe environment be fostered without meaningful community engagement? Can effective public interventions occur without planners visiting the intervention sites? Innovative tools like expanded realities have appeared, offering alternatives to traditional urban planning paradigms (Adrienne & Nora, 2024). This study explores extended realities as a means of raising awareness among public and community stakeholders, advocating for change in complex and evolving urban landscapes. The abstract delves into two case studies conducted in urban settlements in Fortaleza, Ceará, Brazil. The first case focused on leveraging virtual reality (VR) by creating immersive 360-degree images from a vulnerable study site, engaging children from the community to envision their "city of the future." These youthful aspirations were visually overlaid onto the 360-degree imagery, facilitating a deeper understanding for external actors and fostering closer connections with residents. In the second case study exploring extended reality (XR), a prototype was developed for an interactive educational experience, allowing users to comprehend the inner workings of a rain garden. Both projects employed extended reality glasses for development and interactive engagements. The overarching goal is to establish VR/XR tools as pivotal instruments for negotiation, striving for more inclusive and resilient solutions to burgeoning urban challenges, while also promoting their adoption within academic spheres.

Keywords: Virtual Reality, Vulneable Community, Landscape Planning, Extended Reality, Information Modeling

Experimentation of workshop results.

Meeting with public actors.

Kid's Workshop for "the city of the future"

Photographs of the work with the kids.

Panoramic image taken.

Panoramic image taken for virtual reality experience.

Assessment of Cultural Services in Protected Areas

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OBJECTIVES: The progression of urbanization has accentuated a growing disconnection between humanity and the natural environment. Protected areas system emerge as pivotal conduits for delivering cultural services to both urban and rural communities. In the aftermath of the pandemic, there has been an escalating demand for outdoor recreational activities, underscoring the imperative for in-depth investigations into the cultural services rendered by protected areas. This study consolidated and analyzed the cultural service features across different types of protected areas in Beijing, investigated the factors impacting cultural services within these areas, and offered policy suggestions for the establishment and administration of future protected areas.

METHODS: First, we gathered review data and media images from 28 protected areas. Subsequently, convolutional neural networks (CNNs) were employed to extract features from the images and categorize the scenery of the protected areas into 12 classes, encompassing animals, plants, and structures. Following this, experts and members of the public were actively involved in the creation of a cultural service corpus and the formulation of a 7-indicator cultural service system. Textual data underwent rigorous mining processes to derive cultural service scores for all 28 protected areas. An unsupervised classification methodology was utilitied to categorize Beijing's protected areas into distinct types. Finally, correlation analysis was conducted to investigate the factors that impact the effectiveness of cultural services within protected areas.

RESULTS: Beijing's protected areas can be devided into three distinct types: (1) Entertainment/Aesthetic, (2) Entertainment/Educational, and (3) Historical/Spiritual. The scenic spots and historical sites have the highest overall score in terms of cultural services, but the nature reserves excel particularly in aesthetic and educational scores. The analysis of the contribution of various cultural service keywords reveals the factors influencing the perception of cultural services. The interdependence of cultural service indicators is discerned, revealing synergistic or antagonistic relationships that are further influenced by land-use typologies, the geographical placement of protected areas, and their proximity to water bodies.

Discussions: This study not only introduces a meticulous methodology for examining the nuanced attributes of cultural services within the protected areas system but also establishes culturally relevant evaluation criteria applicable to protected areas. Future enhancements are proposed, including the improvement of facility safety, preservation of the wilderness of attractions, improvement of the online platform for cultural services in protected areas, and the enrichment of activity diversity and interactivity. These improvements are envisioned to enhance the effectiveness of cultural services within protected areas.

Keywords: Cultural services, Protected areas, Social media, Landscape management

Park Recreation Function Optimization using Big Data Landscape Preference Analysis

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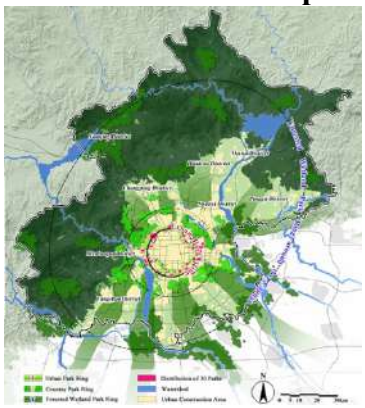
[1]Beijing Forestry University
[2]University of Illinois Urbana-Champaign

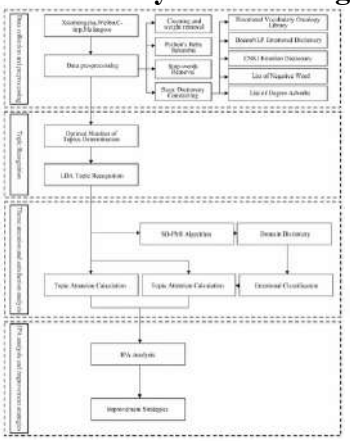
In the era of urban revitalization, urban parks have emerged as crucial green recreational spaces in cities, offering leisure, cultural, and ecological services to the public. Social media data has recently become a significant resource for analyzing visitors' landscape preferences. However, integrating text and image evaluation into the analysis presents a notable challenge. Moreover, it is imperative to integrate the assessment of differences in landscape preferences and conduct frequency analysis of landscape elements' co-occurrence alongside visitors' demographic and visitation characteristics.
This study centers on the 30 most popular and heavily visited comprehensive urban parks within the Beijing metropolitan area in China. It gathered 59,490 image datasets and 24,675 text comments shared by visitors on four social media platforms between 2022 and 2023. Utilizing an LDA clustering model, the study examined the social media texts posted by visitors. Furthermore, by leveraging the Baidu API and employing a fully convolutional neural network to process social media image comments, the study scrutinized the co-occurrence frequency of landscape resources in the images. It proceeded to analyze visitors' landscape preferences by amalgamating various visitor characteristics, travel patterns, and travel behavior statistics to identify construction issues in urban parks. The research findings reveal that visitors have diverse demands for recreational amenities in comprehensive urban parks, including fitness facilities, convenience, affordability, botanical and animal landscapes, and technological features. Visitors expressed higher satisfaction with park density and service coverage, while lower satisfaction was noted for park fitness amenities, parent-child activities, and facilities for children. Visitors exhibited a strong preference for natural biological landscapes over cultural ones. Male visitors leaned towards historical sites, while female visitors preferred scenic lakes and cultural landscapes. Visitors in groups and long-distance travelers showed more interest in historical and cultural landscapes. Through the utilization of big data analysis of visitors' landscape preferences, this study offered a thorough evaluation of a greenbelt comprehensive urban park in Beijing, accurately pinpointing existing construction issues based on visitor preferences and laying the groundwork for enhancing the functionalities of urban parks in Beijing within the context of urban renewal.

Keywords: Social media data, Park Recreational Functions, Comprehensive urban parks, Landscape Preference, Machine Learning

1.The distribution map of 30 comprehensive urban parks

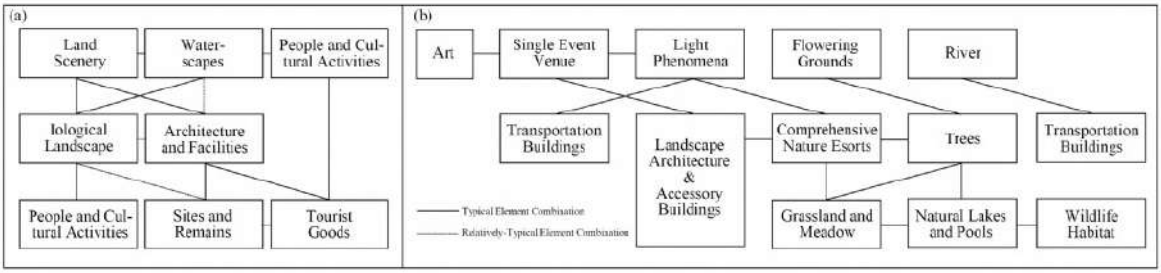


2.Text Analysis Technology Frame



3.Examples of landscape resource classification methods

4.Landscape resource co-occurrence map (a) Major categories (b) Landscape subcategories



Earthquake prediction methodology based on Neural Network Model

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Department of Landscape Architecture, İstanbul Teknik Üniversitesi, Istanbul, Turkiye

Forecasting earthquakes is challenging. One of the main reasons for this difficulty is that it is challenging to detect underground phenomena. However, statistically, 30% of large earthquake foreshocks occur before the main shock, and this indicates that, theoretically, it is possible to forecast them. Therefore, experts such as Turcotte and Donald and Tehseen et al. tried to read the statistical pattern of earthquakes in the past and predict upcoming earthquakes. However, it has been challenging because of the lack of computational data collection and procedures.

With the development of artificial intelligence (AI) and computational methodology, researchers have tried to adopt those methodologies to find the pattern of earthquakes to forecast them, such as Reyes et al., Wang et al., Manral et al., Handan Çam, Osman Duman. Unfortunately, it was limited to finding accurate forecasts and objective evaluation phases from those papers. We questioned the purity of the data they used. Wang et al. collected case data from 1970 to 2021, and Manral et al. used data collected since 1965. According to their data, the frequency of earthquakes under 2.0 ML has steadily increased annually. The frequency of weak earthquakes may have increased over time. However, it is more logical to assume that the ability to detect minor earthquakes has developed over time due to technological advances.

Therefore, we collected magnitude between 2.0 ML and 7.0 ML earthquake cases in Turkiye from 2004 to 2023 to build the database because AFAD adopted the National Seismic Network Development (USAG) in 2004 and used the same system till now (2024). Based on the data, we added the following information to each CASE: latitude, longitude, date, and magnitude. With the database with 187,399 cases, we built the Neural Network Model. This model can forecast earthquakes over 2.0 ML anywhere in Turkiye with a maximum of one month in the future. To evaluate the model, we made the model to predict earthquakes in January 2024 and matched the result to the real events. The pattern between the two was 98% the same. Additionally, the model forecasted an earthquake over 4.0 ML in Istanbul between February and March, which happened on February 19th at 10:46 AM.

Though this prediction model can only predict one month's future and various evaluations must be made throughout the time, this paper carries the value of potential. Additional studies should be conducted to extend the prediction period and accuracy for future research.

Keywords: Artificial Intelligence, Big Data, Earthquake, forecast system, Neural Network Model.

Database

	Date	Longitude	Latitude	Magnitude	Magnitude_Bins	Year_Month
0	2023-12-30 22:59:34	38.7836	38.2900	2.4	2-3	2023-12
1	2023-12-30 20:43:24	29.1583	40.2431	3.4	3-4	2023-12
2	2023-12-30 20:30:52	36.1314	38.2206	2.4	2-3	2023-12
3	2023-12-30 17:31:34	36.2194	37.8253	2.5	2-3	2023-12
4	2023-12-30 16:46:06	37.3594	38.4875	2.3	2-3	2023-12
...	...	...	...	...	...	...
187394	2004-01-01 01:03:43	31.9740	38.9801	3.5	3-4	2004-01
187395	2004-01-01 01:01:55	28.8500	38.9700	2.6	2-3	2004-01
187396	2004-01-01 00:52:20	38.6000	39.8300	3.3	3-4	2004-01
187397	2004-01-01 00:40:30	26.7300	38.9400	2.6	2-3	2004-01
187398	2004-01-01 00:05:03	37.6999	37.2509	2.7	2-3	2004-01

187399 rows × 6 columns

AFAD case data of earthquakes in Turkiye.

Prediction result

```
    # Belirtilen tarih için tahmin yapma
    prediction_proba = mlp_classifier.predict_proba(new_data_scale
    return prediction_proba * 100  # Olasılıkları yüzde cinsinden

# Tahmin etmek istediğiniz tarih aralığını belirleyin
start_date = datetime(2024, 3, 1)  # Mart 2024'ün ilk günü
end_date = datetime(2024, 3, 31)    # Mart 2024'ün son günü

coordinates = np.array([
    [39.9334, 32.8597],  # Ankara
    [41.0082, 28.9784],  # İstanbul
    [38.4192, 27.1287],  # İzmir
    [36.8969, 30.7133]   # Antalya
])

# Tahminleri alın
probabilities = predict_probability_for_date(coordinates, start_da
print("Probability of 4 or above in next month:")
for city, prob in zip(["Ankara", "İstanbul", "İzmir", "Antalya"],
    print(f"{city}: {prob:.2f}%")

# Modelin performansını değerlendirin
y_pred = mlp_classifier.predict(X_scaled)
accuracy = accuracy_score(y, y_pred)
print("Model Accuracy:", accuracy)
```

Loading...

✓ 174m 16.0s

```
Probability of 4 or above in next month:
Ankara: 54.80%
İstanbul: 97.67%
İzmir: 98.91%
Antalya: 82.69%
Model Accuracy: 0.9791727810714038
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Result of earthquake prediction in three major cities in Turkiye.

"Redefining Smart City Implementation: A New Model From Turkey's Experience"

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This research introduces a transformative approach to smart city development through the lens of a novel triple helix model that harmonizes smart governance, technology, and community engagement, addressing the critical gaps in current implementation frameworks. In the midst of rapid urbanization and the urgent need for sustainable urban development, this study critiques traditional techno-centric models and advocates for a holistic integration that harmonizes the efforts of government, industry, and citizens. The objective is to not only redefine smart city implementation but also to propose a universal model that facilitates global urban innovation and sustainability.

Employing a mixed-methods approach, the study integrates desktop research, surveys, interviews, and case studies across various urban contexts, with a particular focus on Turkey's experience. The research critically evaluates Turkey's smart city landscape, revealing a significant disconnect between ambitious plans and their tangible impacts. This disconnect is largely attributed to the absence of a unified strategy that effectively combines governmental actions, technological advancements, and citizen participation.

The proposed triple helix model emerges as a foundational framework for future smart city initiatives, emphasizing the need for collaborative governance, strategic technology deployment, and active citizen engagement. Analysis of 115 municipal websites and a survey of 1141 citizens across four major Turkish cities underscore the model's necessity, demonstrating that without informed and involved citizens and a responsive government, smart city projects fail to achieve their full potential.

Results from this study highlight the significant gaps in current implementations, where technological solutions are often prioritized without sufficient consideration for governance and citizen involvement. The triple helix model's application in selected smart city projects illustrates its potential to enhance urban innovation, inclusivity, and adaptability, presenting successful instances of stakeholder integration.

In conclusion, the future of smart cities lies in approaches that prioritize inclusivity, adaptability, and collaboration. This research contributes a critical perspective to the smart city discourse, offering a scalable and flexible framework capable of addressing diverse urban challenges. By advocating for a participatory approach to urban development, the model ensures that the benefits of smart cities are equitably distributed, calling on policymakers, urban planners, and technology providers to adopt this integrated model for more inclusive and sustainable urban futures.

Keywords: Sustainable Smart City, Smart People, Smart Governance, Smart Mobility

Analyzing public emotions in residential green spaces using multi-source data

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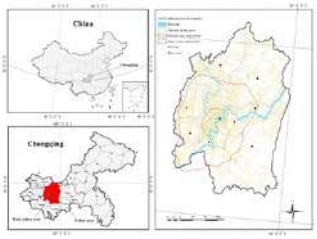
[Objectives] In the context of rapid urbanization, public green spaces play a vital role in alleviating mental stress caused by the high-density and overloaded built environment. The rich environmental features of residential green spaces, including functionality and aesthetics, significantly impact public emotions. In the densely populated and topographically varied central urban areas of Chongqing, where high-density issues are severe, establishing the correlation between residential green spaces and public emotions is crucial for enhancing human well-being.
[Methods] Data such as residential names, construction years, floor area ratios, and residential evaluations were collected from the Fang.com real estate website. The method of text sentiment analysis was employed to visualize the distribution of residential areas and public emotions in the central urban areas of Chongqing. Considering the emotional scores and typical features such as high density, 10 typical residential areas with an average floor area ratio of 4.96 (4 positive, 4 negative, 2 neutral) were selected for online questionnaire surveys and field research. A system based on multidimensional feature index for residential green spaces was established, covering functionality, ecology, aesthetics, culture, and sociability. This system was used to analyze and explore the correlation mechanisms between the characteristics of residential green spaces and public emotions.
[Results] The analysis revealed that from the 783 valid residential areas listed on the website, a total of 6,355 housing review data were collected, along with 202 valid questionnaires gathered online. On a larger scale, residential areas in Chongqing are distributed in a "large groups, small gatherings", with high-density patterning across Yuzhong District, Jiangbei District, and Yubei District. Positive emotions constitute the largest portion of public emotions (74.9%), followed by negative emotions (24.7%), and a small amount of neutral emotions (0.4%). Specifically, along both banks of the Jialing River, the volume and density of public emotional expressions are substantial, with the north bank displaying a higher mix of positive and negative emotions, while the south bank predominantly features positive emotions. On a smaller scale, among the multidimensional indicators of the10 typical residential areas, the color of the green space pavements is the most significant feature affecting public emotions ($r=0.961$, $p<0.01$), followed by the completeness of accessible facilities ($r=0.881$, $p<0.01$) and olfactory perception satisfaction ($r=0.869$, $p<0.01$).
[[Conclusions] This study has established the relationship between high-density urban residential areas and public emotions, exploring the diverse impacts of residential green space features on public emotions. The findings also offer valuable insights that optimizing the functional and aesthetic design of green spaces in high-density residential areas will have a positive effect on improving quality of life, alleviating stress, mitigating depressive emotions, and promoting physical and mental health.

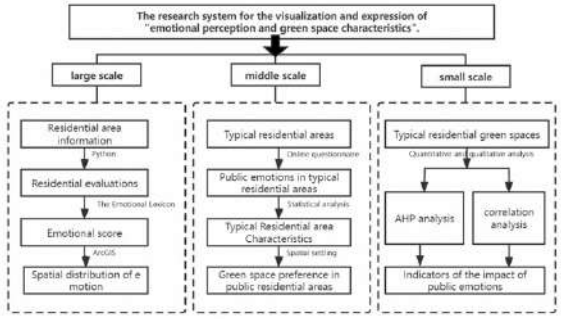
Keywords: high-Density,Chongqing,big data

Location of the study area

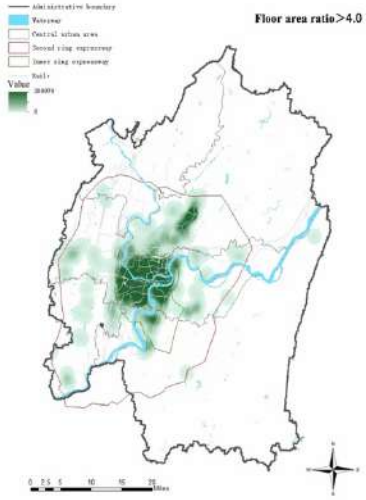


The center area of Chongqing is more of a cultural and economic core, which plays a important role in the research of high-density city in Chia.

"Emotional perception- Green space characteristic"visualization research program

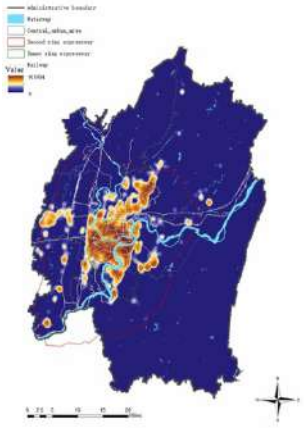


Distribution of high-density residential areas in central urban areas of Chongqing



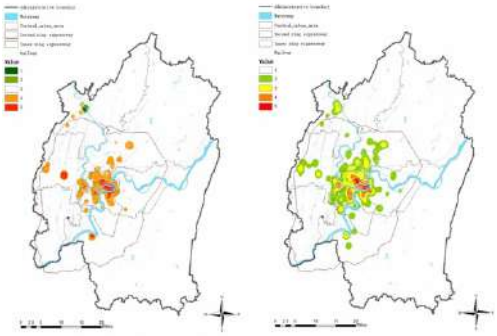
According to the definition of Chongqing's residential planning, a plot ratio greater than 4 is considered a high-density area. The high-density residential area patterned across Yuzhong District, Jiangbei District, and Yubei District.

Distribution of residential areas in central urban areas of Chongqing



The residential areas in Chongqing are distributed in a "large groups, small gatherings".

Positive and negative emotions distribution in residential areas



Along both banks of the Jialing River, the volume and density of public emotional expressions are substantial, with the north bank displaying a higher mix of positive and negative emotions, while the south bank predominantly features positive emotions.

10 typical residential areas

Residential number	Construction time	Residential name	Floor area ratio	District	Emotion Score Ratio	Emotional tendency
1	2006	Yuzhong Mingcun	4.05	Yubei district	3	positive
2	2009	Luneng Star City 8 blocks	4.62	Jiangbei district	3	positive
3	2012	Longhu River and City-Thousands of Trees	2.8	Yubei district	4	positive

4	2017	Longhu River and City - Original Mountain Time	5.57	Yubei district	2	positive
5	2006	Huayu Yuzhou Xindu	4	Yuzhong district	1	neutral
6	2018	Longhu River and City-Qinghui Time	2.3	Yubei district	1	neutral
7	1980	Shuanggang Road District	10	Yuzhong district	0.33	negative
8	2007	Jiahua Xincheng	7.13	Yuzhong district	0.33	negative
9	2012	Longhu River and City- View Uptime	3.5	Yubei district	0.30	negative
10	2016	Luneng Star City 13 blocks	5.58	Jiangbei district	0.44	negative

10 typical residential areas with an average floor area ratio of 4.96 (4 positive, 4 negative, 2 neutral) were selected for online questionnaire surveys and field research.

Summary table of the weight index of characteristics in residential areas

Target layerA	Standardized layerB	Weight B	ndicator layer C	Weight C	Total weight
characteristics of green spaces in residential areas (A)	functionality (B1)	0.41	traffic fluency (c1)	0.39	0.1624
			spatial richness (c2)	0.27	0.1135
			accessibility integrity (c3)	0.18	0.0745
			night lighting (c4)	0.10	0.0393
			sanitation and maintenance facility (c5)	0.06	0.0236
	ecology (B2)	0.17	green area ratio (c6)	0.27	0.0461
			per capita greening area (c7)	0.39	0.0665

			green coverage (c8)	0.13	0.0216
			green view index（c9)	0.13	0.0216
			canopy density (c10)	0.06	0.0103
			woody plant diversity (c11)	0.03	0.0053
	aesthetics (B3)	0.10	plant seasonal diversity (c12)	0.21	0.0201
			plant color diversity (c13)	0.11	0.0104
			sky ratio (c14)	0.15	0.0150
			green paving colors (c15)	0.03	0.0024
			width of pedestrian roads (c16)	0.39	0.0376
			olfactory perception satisfaction (c17)	0.05	0.0047
			auditory perception satisfaction (c18)	0.07	0.0070
	culture (B4)	0.06	geographical characteristics of planted landscapes (c19)	0.75	0.0444
			planted landscape period characteristics (c20)	0.25	0.0148
	sociability (B5)	0.26	security (c21)	0.63	0.1642
			satisfaction (c22)	0.11	0.0275
			sense of belonging (c23)	0.26	0.0675

The weights of the 23 indicators were obtained by AHP weighting analysis.

Results of multi-dimensional evaluation of green space characteristics in residential areas

Standardized layer	Indicator layer	1	2	3	4	5	6	7	8	9	10
functionality	C1	3.15	3.29	3.5	3.05	3.35	3.36	2.75	3.05	2.55	3.00
	C2	3.00	3.62	3.55	3.55	3.35	3.14	2.80	3.00	3.30	2.95
	C3	2.65	3.33	3.65	3.30	2.55	3.55	2.65	3.20	3.65	2.80
	C4	2.80	3.24	3.55	3.80	3.15	3.45	2.55	3.15	2.95	2.75
	C5	3.10	3.00	3.15	3.40	2.55	3.73	2.35	2.55	3.45	2.25
ecology	C6	90.00	90.00	90.00	76.00	90.00	76.00	76.00	90.00	76.00	92.00
	C7	80.00	100.00	90.00	68.00	91.00	99.00	30.00	55.00	65.00	75.00
	C8	81.00	95.00	91.00	91.00	90.00	93.00	82.00	90.00	98.00	90.00
	C9	71.00	75.00	96.00	91.00	75.00	86.00	85.00	96.00	98.00	93.00
	C10	81.00	100.00	88.00	92.00	96.00	89.00	89.00	91.00	97.00	98.00
	C11	72.00	88.00	66.00	67.00	76.00	67.00	20.00	65.00	70.00	62.00
aesthetics	C12	2.00	4.00	5.00	4.00	3.00	5.00	2.00	2.00	4.00	4.00
	C13	3.40	4.00	4.60	4.20	2.80	4.80	2.40	2.00	4.00	3.80
	C14	62.00	6.00	77.00	78.00	55.00	85.00	27.00	20.00	85.00	51.00
	C15	2.75	4.50	4.25	4.00	2.75	4.00	2.50	2.25	4.25	3.00
	C16	3.50	4.50	5.00	3.50	3.00	4.50	2.50	3.00	3.00	3.50
	C17	3.25	4.00	5.00	4.00	3.50	4.50	2.75	2.50	4.00	2.75
	C18	3.25	4.25	4.75	3.00	3.00	4.00	3.50	3.00	4.50	2.25
culture	C19	3.00	4.00	3.25	3.00	3.50	3.00	4.00	3.50	3.00	3.00
	C20	2.75	3.75	4.25	3.75	3.75	4.25	3.25	3.50	3.75	3.25

sociability	C21	3.10	3.62	3.10	3.10	2.90	3.55	2.40	2.55	3.05	2.55
	C22	3.10	3.71	3.75	3.45	3.30	3.45	2.50	2.45	2.40	2.60
	C23	2.80	3.05	3.40	3.35	3.45	3.45	2.80	3.00	3.55	2.40

The Assessment of green space characteristics indicators for 10 High-Density Residential Areas

Public emotion Score of Green Spaces in Typical Residential Areas and Evaluation Results of the Indicator System

Residential number	Public emotions	Sscore for the Green Space Characteristics Indicator system
1	22.49	17.34
2	25.46	18.93
3	26.26	19.49
4	25.54	17.13
5	23.22	18.54
6	26.12	19.38
7	19.60	12.73
8	21.62	15.77
9	23.46	17.25
10	20.08	17.60

Public emotion scores for residential areas were obtained through an online questionnaire and compared with the results of the green space characteristics indicator system.

Relevance data analysis

Indicator layer	Relevance evaluation	Description of results
C1	0.162	irrelevant
C2	0.751*	positive correlation
C3	0.881**	significantly positive correlation
C4	0.702*	positive correlation
C5	0.820**	significantly positive correlation
C6	-0.426	irrelevant
C7	0.440	irrelevant

C8	0.707*	positive correlation
C9	0.277	irrelevant
C10	0.202	irrelevant
C11	0.379	irrelevant
C12	0.805**	significantly positive correlation
C13	0.813**	significantly positive correlation
C14	0.430	irrelevant
C15	0.961**	significantly positive correlation
C16	0.651*	positive correlation
C17	0.869**	significantly positive correlation
C18	0.727*	positive correlation
C19	-0.193	irrelevant
C20	0.744*	positive correlation
C21	0.756*	positive correlation
C22	0.552	irrelevant
C23	0.658*	positive correlation

Overall, indicators in functionality and aesthetics showed significant positive correlations with public emotions in green spaces in high-density residential areas.

Landscape design's sustainability evaluation digital twin and user decision-making support

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BACKGROUND:
In the era of climate change, the importance of improving the environmental performance of landscape spaces and creating sustainable open spaces that adapt to climate change is becoming more prominent. In the landscape design field, we have pursued the climate-adaptive design that is sustainable and can improve resilience to natural disasters to respond to the climate crisis. However, during this design process, it was not easy to make general users aware of the value of sustainable design that we pursue, and there were limitations in quantifying and evaluating this value. This makes it difficult to make decisions about our sustainable design.

OBJECTIVES:
In this study, we developed a digital twin that can evaluate the sustainability of landscape space in real-time at the landscape design stage. Using this, we intend to make general users aware of the value of sustainability in landscape design and explore the effect of supporting users' design decision-making.

METHODS: In this study, an interactive digital twin of the campus open space design was developed using Unreal Engine 5. Based on the evaluation certification items of LEED and SITES, we developed a real-time interactive simulation system that can simulate the impact and evaluation results of various landscape design options related to the heat island effect. The developed digital twin was experienced by actual users of the space, and decisions were made about sustainable landscape design options for the open space. Through a survey, the digital twin's support effect on design decision-making was evaluated.

RESULTS: As a result of this study, users were able to more easily recognize the value of landscape space sustainability through the digital twin. Also, it was found that user design decisions can be made more easily and quickly through the real-time simulation of sustainability evaluation results according to landscape design options.

CONCLUSIONS:
The values we pursue as landscape architects require understanding and acceptance not only by ourselves but also by the public. Only then can we use our expertise to realize our values in the actual design process. We believe that the real-time evaluation and simulation digital twin of landscape design sustainability developed in this study can be a useful way to empathize with users about the value of our sustainable space creation and support them in making

acceptable decisions. This could be a direction we need to explore in the era of digital transformation.

Keywords: Real-time simulation, Digital transformation, Participatory design, Landscape simulation, Unreal engine 5

Digital Twin Development

Digital twin execution screen

User digital twin experience

Digital twin experience of users of the campus open space (just parts of the participants in this figure)

Generating Parks from Satellite: A Fully Automated AI Design Workflow

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Despite the advanced capabilities of AIGC (Artificial Intelligence Generated Content) in creating detailed drawings, the accurate generation of landscape architecture floor plans from scratch remains a formidable challenge in AI technology. It can be argued that generating floor plans for landscape architecture remains one of the most challenging research areas in the field of design intelligence. We have developed a complete automated process where users need only provide remote sensing satellite images of the site, and the algorithm can directly generate detailed design floor plans through a series of calculations.

This work aims to address two significant research gaps in current floor plan generation:
1) Most studies focus solely on the relationships between design elements, neglecting the external information of the site;
2) GANs and other traditional generative algorithms produce results with low resolution and insufficient details.

To overcome these issues, we integrated GAN with the Stable Diffusion multimodal large-scale image pre-training model to construct a full-process park design generation METHOD:
1) First, a high-precision remote sensing object extraction system is built for automatically extracting urban environmental information;
2) Next, a park design generation system based on the external environment is constructed using GAN, capable of quickly inferring and generating design plans from urban environmental information;
3) Finally, Stable Diffusion is introduced to optimize the design plan, enhance details, and increase the plan's resolution by 64 times. This method achieves a fully unmanned design automation workflow.

Our findings indicate:
1)The relationship between the inside and outside of the site affects the algorithm's output;
2) Compared to traditional GAN algorithms, Stable Diffusion significantly improves the richness of information in the generated results.

This research, spanning three years, evolved from simple rendering to achieving a "from remote sensing to floor plan" capability, overcoming several challenges and establishing a complete design process.

Keywords: Urban park, Generative design, Generative adversarial network, Artificial-intelligence-aided design, Land cover classification

Goodbye Photoshop: AI Turns Hand-Drawn Sketches Into Detialed Planning Maps

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With the help of AI, rapidly generating color images from hand-drawn sketches does not seem difficult. However, most research focuses on creating planes from edges recognized by machines rather than from real hand-drawn images. In practice, landscape architects require the generation of complete color plan maps from conceptual hand-drawn images, not from edges identified by machines.

Despite the power of AI technology, it remains ineffective for the design process of landscape architects, who still need to adjust the color master plans bit by bit using tools like Photoshop.

To address this issue, we trained an algorithm using a large number of real-world hand-drawn sketches and corresponding plan maps, specifically developing a color plan generator for landscape architects.

To solve this problem, our research introduced a system based on GANs to quickly transform black and white park sketches into comprehensive color designs. We designed multiple reference groups for experimental testing, comparing Pix2pix, CycleGAN, real human hand drawings, different volumes of data, different qualities of data, and employing data augmentation strategies to improve output quality, ultimately determining the best working method.

The research shows that:

1)Our model efficiently produces designs suitable for industrial applications.
2) Data augmentation based on GANs improved the quantity of data, leading to enhanced rendering effects.
3) Our unique method of rendering directly from sketches provides new approaches in urban planning and design.

This work accelerates the iteration speed of designers' thinking through AI technology, thereby improving the speed and efficiency of the entire design process. Our developed algorithm has now been industrially implemented, filed for two Chinese patents, and is already in production at a listed company in China.

Keywords: hand-drawn sketch, image color rendering, generative adversarial networks, data augmentation, landscape design

LA-GPT: Supermodel Forged by Training on Billion-Scale Landscape Architects Corpus

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The explosion of ChatGPT, a large language model, sparked a global AI revolution starting in 2023, with every industry training its own specialized large language models. These models have become the foundational infrastructure for future industry transformations, with each sector building its own intelligent ecosystems based on large language models. Landscape architecture, a critical industry for human habitation and ecological safety, has yet to develop a mature, dedicated large language model, according to a Microsoft survey report.

In response, we dedicated a year to developing a LLM specifically for landscape architecture:

Firstly, data is paramount. We merged human efforts with semi-supervised and reinforcement learning to build a billion-scale database covering planning, plants, architecture, and landscapes. It includes 240,000 design projects (2008-2023), thousands of monographs, 150 million academic papers on landscape terms, and multimodal data.

Secondly, the algorithmic architecture is the soul of the project. We tested the efficacy of the most mainstream methods like RAG, SFT, AGENT, and COT in training a real, dedicated large language model for landscape architecture.

Lastly, we expanded into multimodal algorithms. Landscape architecture is not purely textual but combines images and text, necessitating tasks like intelligent layout, image generation, design review, and CAD format conversion based on multimodal language models. Therefore, we developed higher-version models for various modalities on top of the pure text-based language model.

Attached is our complete research report:
It begins with an overview of the potential applications of LLM in human settlements construction. Then, it conducts a comprehensive review of existing vertical LLM models and image models, aiming to address diverse application scenarios. The construction of the text-based LLM involves exploring Retrieval-Augmented Generation (RAG) and Specific Fine-Tuning (SFT) methods, assessing their advantages and disadvantages in the complex application contexts of human settlements construction. A comparative analysis between LLM and RAG is proposed, evaluating their effectiveness both individually and combined using GPT-4. Finally, a multimodal LLM is developed, with its performance evaluated through GPT-4.

The findings demonstrate:
The effectiveness of our data generation pipeline in acquiring domain-specific knowledge, with RAG and SFT showing quantitative and qualitative advantages. RAG excels in integrating external knowledge bases to enhance model understanding of complex design requirements. SFT significantly improves model adaptability and precision in generating design schemes. The construction of the multimodal LLM demonstrates its capability to

effectively integrate text and image information, enhancing the innovativeness and adaptability of design schemes by simulating designers' multimodal thought processes.

By integrating NLP and CV-AI technologies, especially through the use of RAG and SFT methods and the construction of a multimodal LLM, this research not only drives innovation in the field of human settlements construction but also enhances design efficiency and quality.

These findings underscore the immense potential of blending multimodal learning and large language models in human settlements construction.Our work has already received national funding and commercial investment from Chinese investment institutions and has been recognized as one of China's top ten AI application scenarios.

Keywords: Human-settlement, large language model, multimodal

ORAL PRESENTATIONS
Projecting the Process: Monitoring, Assessment & Applications

La Cantera Natural Park: Enhancing Open Spaces through Nature-Driven Design

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In Chile, 88% of the population lives in urban areas (World Bank, 2022). The uncritical exploitation of natural resources has led to a decline in the quality of life and increased vulnerability to environmental crises in cities. To address this, the Cerros Isla Foundation (CIF), a non-profit organization, aims to enhance people's well-being by recognizing and valuing the geographical and landscape features in urban areas.

Island hills, unique formations in mountainous regions, are crucial resources for expanding semi-natural spaces and addressing environmental challenges (Fernández, 2009). In Santiago, the capital of Chile, these hills play a crucial role in addressing the deficit and uneven distribution of green areas, particularly in districts with less than 3m² of green space per inhabitant.

La Cantera is an 8ha privately owned island-hill located in a low-income municipality with limited urban spaces that could foster ecological and social connectivity. Recognizing this potential, CIF aims to transform into a public educational nature park, improving accessibility and infrastructure while restoring its natural ecosystems through an open, nature-centered, and long-term design.

The process of designing the hill's transformation began with an analysis of its natural values and ecological and social conflicts, resulting in a preliminary master plan to guide strategic future development. Key findings include the discovery of native geophytes, shallow substrate depth, and the imperative for sustainable irrigation practices.

To tackle the project's size and complexity, a phased approach was adopted, focusing on five zones – summit, east, west, south, and north. This ensures gradual activation and vegetation restoration. The first zone designed was the 'Trigger Project,' a trail area along the hill's crest from base to summit. Also, educational, community, and ecological restoration programs were developed, supported by a preliminary business model for long-term sustainability.

To ensure the success of the hill's transformation, the implementation prioritize the ecological restoration program, which unfolds into five stages for each zone: (1) Comprehensive evaluation of the natural conditions to identify risks and assess the existing values; (2) Strategic removal plan for non-native trees, outlining access trails, storage areas, and future destinations, while considering reuse of extracted timber; (3) Passive and active ecological restoration program that includes collecting and nurturing seeds, protecting native species, and planting extensive areas and nodes of plant associations; (4) Establish support infrastructure to programmatically activate the site. This includes the construction of trails, geographic overlooks, planting cores, a greenhouse, parking lots, plazas, etc; (5) Facilitate open fields for academic and civic groups to investigate restoration prototypes and engage with the community.

Overall, La Cantera Natural Park project represents a comprehensive and open process that transforms a hill –historically planted with non-native vegetation and currently in a state of deterioration–, into a biodiverse and socially enriched ecosystem. In addition, it provides the community with access to a private space that redefines itself as a nature park dedicated to environmental education. This process aims to generate multiple educational opportunities with a commitment to sustainable development and community well-being.

Keywords: Island hills, urban hills, natural-urban areas, open driven-design, nature based solutions

Urban Riverside Green Space Cultural Ecosystem Services from Online Commentary

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Urban public green spaces possess a significant value in terms of ecosystem services, while their cultural services exhibit sensitivity and high levels of participation, catering to people's aesthetic preferences and spiritual needs. A meticulous assessment of the cultural service level of urban public green spaces and the proposal of renovation suggestions for specific landscape areas can effectively address the fundamental cultural requirements of the public and enhance residents' quality of life. However, the potential of large-scale participatory social media platforms in China, with their extensive user engagement and generation of abundant review information, remains largely untapped for assessing perceptions of urban riverside green spaces. This underutilization primarily arises from the absence of geographical location information associated with such reviews. Moreover, limitations in the accuracy and volume of available geographic positioning data have led research efforts to predominantly focus on large-scale green spaces and clusters of urban parks, while neglecting open urban riverside green spaces. Consequently, there is currently no established scientific and systematic method for evaluating cultural ecosystem services (CES) in urban riverside green spaces. Additionally, the evaluation results of CES have not been effectively linked to the actual activities of visitors, presenting challenges in providing clear and specific guidance for site planning and renovation. Therefore, there is an urgent need for a novel approach that effectively extracts valuable information from comment data on large-scale participatory social media platforms, associates evaluation texts with relevant research site information, facilitates the organization of comment data, expands the pool of data sources for CES evaluation, explores the correlation between the cultural service level and site usage, and enhances the scientific and rational decision-making process in urban planning.

Taking the riverside green spaces in the urban area of Hutuo River as an example, this study proposes a CES perception method suitable for urban riverside green spaces: obtaining site social media evaluation data, extracting effective information from comment texts, associating with site information, and placing the evaluation data in specific landscape spaces for CES mapping. On this basis, priority renovation areas are identified through spatial correlation analysis.

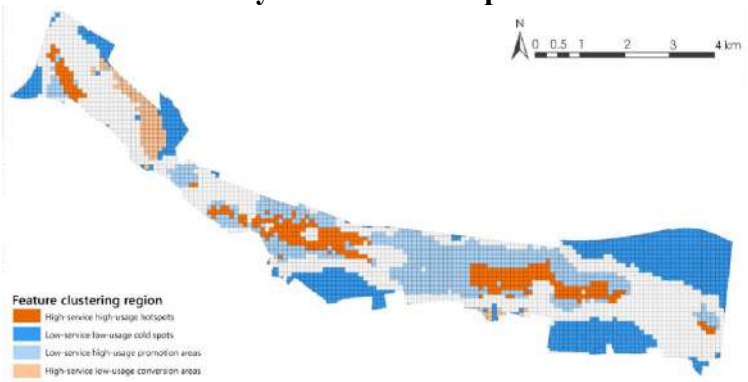
The findings of this study reveal that the urban riverside green space under examination possesses a strong capacity to offer aesthetic experiences, sightseeing opportunities, and recreational services. The cultural services provided by the urban riverside green space ecosystem in the study area exhibit spatial agglomeration and service diversification. Specifically, four distinct categories of areas have been identified on the website: high-service high-usage hotspots, low-service low-usage cold spots, high-service low-usage conversion areas, and low-service high-usage promotion areas.

This research extends the available data sources for CES assessment based on social media text mining. By combining word frequency analysis with text segmentation techniques, a multi-level landscape feature cultural service perception method enhances the accuracy of

CES evaluation. This method more precisely couples social media texts with landscape features, providing guidance for the improvement of urban waterfront green spaces.

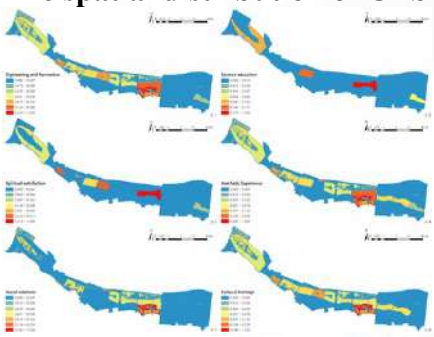
Keywords: urban riverside green space, cultural ecosystem services, social media, landscape perception, spatial mapping

LISA Cluster Analysis of CES Comprehensive Value and Site Utilization



The spatial distribution of CES comprehensive value in riverside green spaces

The spatial distribution of CES values for various types of riverside green spaces



Reading the impacts of land-use/land-cover change around watersheds of Istanbul

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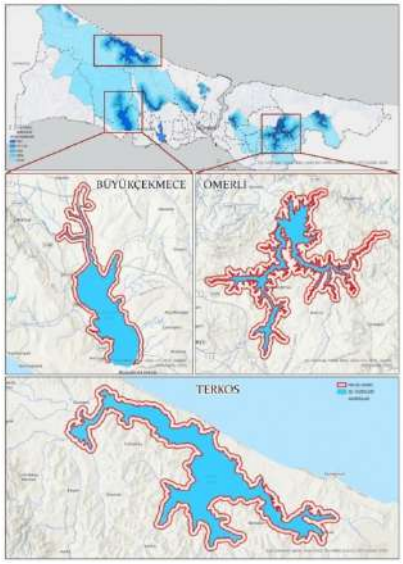
The climate crisis is forcing us to be more rational about our activities on the planet. At a time when the relationship between the built environment and the natural environment is evolving from a human-centred to an ecosystem-centred approach, water catchments, which form the landscape matrix of natural water resources of cities, deserve better attention.
Water catchment areas are not only the sources from which clean water is drawn, but also the carriers of social-ecological memory, where the natural and cultural characteristics of the productive rural geography are preserved. At the same time, they are reservoirs of biodiversity and places where people can experience pure nature.
Although catchments are protected areas, the urban land uses in their immediate vicinity put considerable pressure on the natural and cultural landscape features mentioned above. These pressures also have a negative impact on the ecosystem services provided by the catchments. In this study, we will attempt to examine the effects of land use/land cover (LU/LC) changes occurring around the catchments and particularly on the watershed protection belts, which are part of the urban ecosystem.
Istanbul, which has a rich water topography, has been selected as a sample area. The protection belts of the three main drinking water basins of the city, Terkos, Büyükçekmece and Ömerli basins, which are the largest watersheds of the city were determined as study cases. In these areas, land use-cover change is taking place both by utilising the loopholes in the protection laws and in complete violation of the law, both area is under intense urbanisation pressure.
The change in LU/LC over the last twenty years in each slice of the protected areas has been calculated using the remote sensing method with data obtained from satellite imagery. The data, collected in 10-year periods, cover the years 2003, 2013 and 2023. Satellite images were selected during the summer months when vegetation change is low and land change can be clearly visualised due to the absence of snow cover. Sentinel 2 satellite images were preferred because they provide optical images with a resolution of 10 m. These data are used to analyse the impact of the observed changes on the landscape matrix and the ecosystem services provided by the basins.
Preliminary results of the study show that urbanisation around drinking water catchment protection zones has a negative impact on the natural and cultural landscape characteristics of the catchment areas. Watersheds, which are important infrastructures of the urban ecosystem, are the areas most affected by urban dynamics. In order for these areas to successfully provide their ecosystem services, it is necessary to regularly monitor changes in their environment. Moreover, the urbanisation pressure around water catchment areas should be controlled through catchment-specific legislation and protection programmes implemented through participatory planning methods. The analyses we have conducted in Istanbul indicate that it is time for a code-red for the city's water basins.

Keywords: Water Catchments, Remote Sensing, Urban Ecosystem, GIS, Istanbul

StudyCases



Istanbul's Water Catchment Areas Map (Adopted from Istanbul Metropolitan Municipality Report, 2021)

Projecting Istanbul Alternative Futures: An Approach for Understanding Urban Change

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With change comes uncertainty. Alternative futures is a framework which has the capacity to understand change through projective scenarios of future change for a system or a set of systems. The urban landscape of Istanbul, Turkey, embodies a rich tapestry of history, culture, and dynamic change fraught with key issues and uncertainties. In this alternative future project, we employ a mixed-methods approach to project various scenarios of urban transformation, combining qualitative insights from subject matter experts with quantitative geospatial data analysis. Organized into three phases, our research delves into the intricate interplay between cultural identity, urban form, and streetscape character to anticipate future trajectories of change in Istanbul's built environment for 2050.

Phase One: Preceding on-site visits, Phase One focuses on data collection, analysis, and the projection of future land use and cover in Istanbul. Leveraging geospatial datasets, we explore the evolving built environment, laying the foundation for subsequent qualitative inquiries.

Phase Two: Engaging subject matter experts and local municipality leaders through a participatory approach, Phase Two involves the analysis of qualitative inputs to discern consensus and recurring themes. Through coding and synthesis, we elucidate the complex factors shaping Istanbul's cultural vernacular, urban morphology, and streetscape dynamics.

Phase Three: Synthesizing qualitative and quantitative findings, Phase Three generates scenario-based alternative futures for Istanbul. Three components—Cultural Vernacular, Urban Form, and Streetscape Character—are examined in depth to anticipate how cultural identity, spatial configurations, and street design will evolve over time. As a common key performance indicator, we intend to utilize the United Nations Sustainable Development goals as a metric of change.

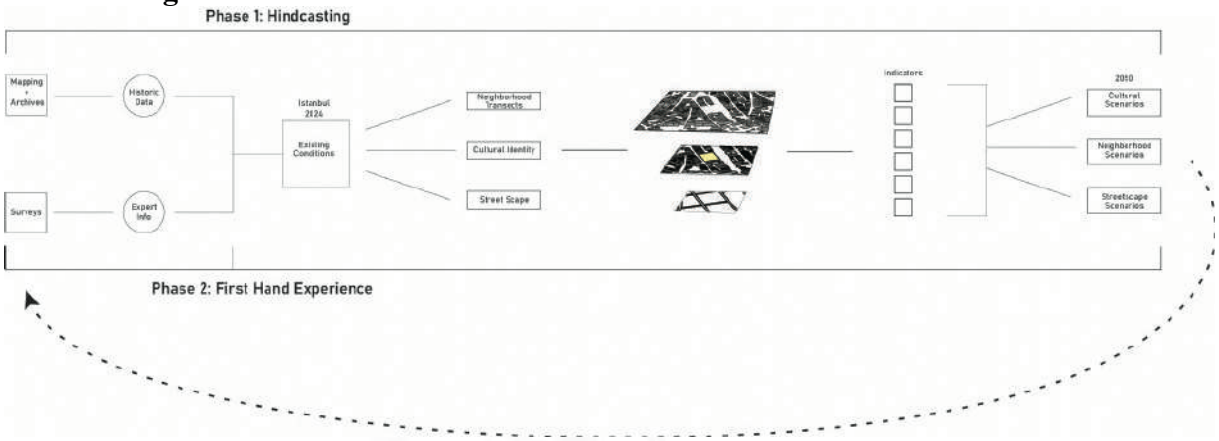
In Component 1, we scrutinize Istanbul's neighborhoods to understand how cultural identity influences the urban landscape. By probing historical, social, and economic dimensions, we assess the extent to which cultural heritage shapes built environment dynamics. Component 2 investigates the diffusion of culture within Istanbul, exploring its boundaries and mechanisms of dissemination. Combining remote analysis with on-the-ground investigations, we discern the intricate web of cultural interactions shaping urban life. Component 3 focuses on Istanbul's streetscape, evaluating how street networks, design, and land use impact pedestrian experience and safety. As a hub of social interaction and heritage tourism, understanding streetscape dynamics is crucial for enhancing public spaces.

Through this mixed-methods approach, our project aims to inform urban planners, scientists, and municipal leaders about potential trajectories of change in Istanbul. We intend to disseminate our results through a web-based tool and dashboard. Furthermore, by engaging undergraduate researchers, we aim to demonstrate the utility of mixed methods in detecting

and understanding urban change over time. In summary, our project offers a comprehensive framework for projecting Istanbul's future, shedding light on the intricate processes shaping one of the world's most dynamic cities. By integrating mixed methods and engaging with interdisciplinary perspectives, it seeks to expand the toolkit available to researchers studying dynamic urban environments. Through collaborative efforts with local communities and stakeholders, it fosters a participatory approach to urban development, promoting inclusivity and resilience in the face of future uncertainties.

Keywords: Alternative Futures, Scenario Analysis, Streetscape, Cultural Vernacular, Urban Form

Process Diagram



This process illustrates the combination of the methods (quantitative scenarios with qualitative inputs).

Evaluating the performance of urban green infrastructure: Case ofIstanbul

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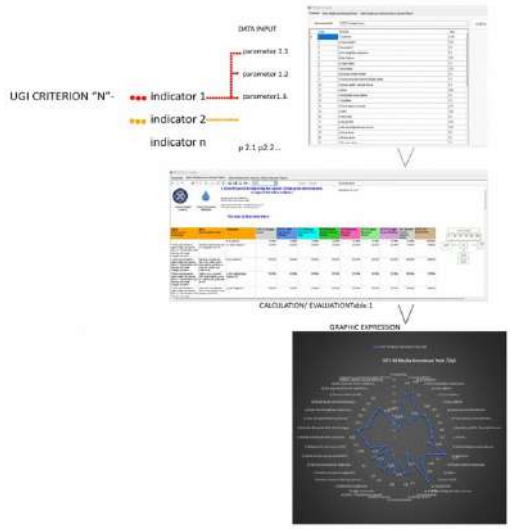
The Green Infrastructure Theory, which has emerged as an update of the Green Systems Theory to reconcile the economic development goals of cities with conservation principles, is a facilitating tool for planners and decision makers to develop the necessary strategies for cities to benefit from green spaces and the ecosystem services provided by natural places. The aim of this research is to propose a qualitative method for evaluating the ecological performance of urban green infrastructure using a multi-criteria approach in order to integrate the green infrastructure strategy into urban landscape planning processes, and to develop a software to implement this method. In order to measure the performance of urban green infrastructure, many studies in the literature have been reviewed. In particular, the basic criteria presented in the study by Davies, C., & Lafortezza, R. (2017) have been developed and the criteria to be considered in the evaluation have been collected in six categories: (1) 'integration with other infrastructure', (2) 'multifunctionality', (3) 'connectivity', (4) 'multiscale', (5) 'diversity' and (6) 'identity'.
The PROSECO software, which was developed as part of the research, provides a mutual numerical evaluation of the data collected in the field for each criterion in the context of the criteria listed above. The 6 criteria identified as the main theme; indicators and parameters defined to measure the success of the evaluated green infrastructure space are evaluated with numerical data on a field basis and a score between 10-100 is entered into the software for each sub-criterion. According to the average value calculation of the software for each criterion, the performance analysis graph of the green areas is obtained. The Istanbul Bosphorus ecosystem was chosen as a sample area for testing the software because it contains a defined landscape integrity. Looking at the urban green areas of Istanbul, the main green infrastructure areas that make up the urban ecosystem are in 4 main typologies as: "urban groves", "parks", "tree-lined streets and boulevards" and "cemeteries". The green infrastructure performance of 8 different green areas was measured in the numerical evaluation (2.7 million m² area size) carried out using PROSECO software in sample areas selected from each typology. According to the results of the analysis, the strengths and weaknesses of each area were identified. The data collected through methods such as on-site observations and measurements made in sample areas, in-depth interviews with the green space managers and users, mapping of spatial characteristics were reflected in the success indicators of the green infrastructure criteria defined in PROSECO Application. Finally the success graphs obtained quantitatively showed the performance of each space in terms of strengths and weaknesses.
It is clear that city administrations should develop strategic action plans to increase urban resilience. In order to use the limited green infrastructure systems in cities more efficiently, it is necessary to analyse the green infrastructure performance, identify weaknesses and create an action plan accordingly. It is thought that the software we propose in this research will be especially helpful for local governments at this issue.

Keywords: Green Infrastructure, Urban Ecosystem, Istanbul, Multi-criteria Performance Assessment

Figure 1



The diagramme explained working process of the performance evaluation software: PROSECO

Exploring the Barriers to Stream Daylighting: The Case of Ankara

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The capital city of Türkiye, Ankara, has been experiencing rapid urbanization since 1950. Urban infrastructure and water systems were built to compensate for the increasing urbanization, ignoring the hydrological and biogeographical values. As polluted urban streams generally provoke negative emotions for public health and set real estate values at risk, to control pollution and contamination, many streams are buried for further construction, such as roads and concrete channels under the river regulations projects called "Dere Islahı". Exacerbated by the lack of infrastructure, Ankara has experienced significant flood events, ecological destruction, and pollution of water bodies due to the discharge of untreated wastewater and stormwater. Efforts to address these issues have been made, including constructing wastewater treatment plants and sustainable basin approaches. However, urbanization's historical impact on the city's waterways remains an underexplored issue in Ankara. Settling in closed and open river basins, Ankara faces climate change disaster risks, which will deal with in the long term, such as sudden urban floods, decreased snowfall, and reduced water resources, affecting both quantity and quality of water and ecosystems dependent on them. To cope with similar problems, part of the sub-discipline of urban stream restoration stream daylighting practice became a global movement as a solution. This study aims to explore the barriers to establishing stream daylighting in the context of Ankara's urban streams. To achieve this objective, global strategies and case studies for stream daylighting were first reviewed, followed by an exploration of the underlying reasons why they cannot be implemented in the Ankara context. This was approached qualitatively, primarily through interviewing techniques. The ultimate aim was to identify possible barriers to establishing stream daylighting involving local initiatives. Then, semi-structured interviews were conducted with the main stakeholders involved in Ankara's urban stream projects, complemented by document analysis of policy documents, spatial development plans, and the city's master plans. The results indicate that barriers to achieving stream daylighting practice in Ankara cluster under five groups: (i) social, (ii) technical, (iii) institutional, (iv) environmental, and (v) economic perspectives.

Keywords: Stream Daylighting, Ankara, Climate Change Mitigation, Decision Making, Qualitative analysis

Repositioning City Centers for Environmental Crises: Potentials of Social Performance

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Urban settlements have always been impacted by environmental crises and human conditions, and urban centers and their open space systems have been the main stage for this friction throughout history. The ever-increasing pace of urbanization and the crises (ie. climate change, pandemics, and earthquakes) the world has been facing in recent decades are becoming more intertwined requiring empirical inquiry in landscape studies. In the era of rapid changes and unpredictability, the need for pragmatic and solution-oriented approaches and interventions has gained greater importance to balance these fragile relationships. In particular, urban centers and their open systems can carry a much greater role, as was experienced in the 2023 Turkiye earthquakes. In this context, strengthening human-environment relations in such settings with evidence-based approaches is a critical area of scientific inquiry.

Landscape performance, an evidence-based approach, is a measure of the effectiveness with which landscape solutions accomplish their intended purpose and contribute to resilience and sustainability. Landscape performance literature offers sets of methods and tools to study the environmental, economic, and social benefits of landscapes to cities and their users. Its origins are based on post-use evaluations that arise from understanding the importance of environment-behavior relationships. So, assessing social factors in urban landscapes is asserted to play an important role in adapting and transforming cities in the 21st century.

The research aims to examine and discuss the changes experienced by Bursa city center due to the effects of migrations, disasters, deforestation, and economic changes, throughout history, and its social implications for the city and its inhabitants. The transformation process of the historical city center, which started to form in the 14th century and is now a Unesco heritage site, was examined using social performance criteria and methods focusing on indicators such as health, safety, security, quality of life, education, social welfare, and public art to name a few.

In conclusion, the socio-spatial transformations experienced by the city center as a result of environmental crises and human conditions are discussed, and the new needs that these changes pose in terms of social performance and, accordingly, evidence-based design are explained. The research asserts that using the historical city center of Bursa, which is at risk of a major earthquake, as an urban laboratory in the age of environmental crises, can inform future landscape architectural practices and the value of an evidence-based approach in such scientific inquiries. Such knowledge and methods can also be examples for other urban centers, and cultural heritage sites with similar concerns in Turkiye and the world.

Keywords: Social performance, Landscape performance, Urban centers, Evidence-based design, UNESCO World Heritage Sites

The Impact Assessment of Industrialization Using Geo-location Community Survey

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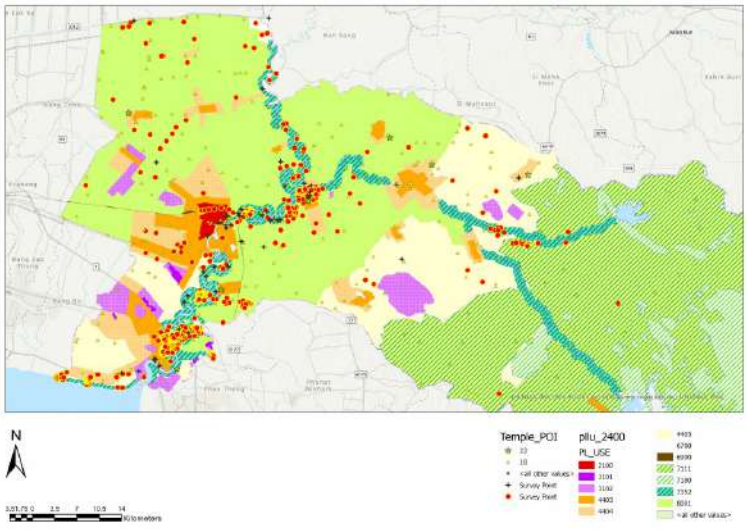
This research paper summarized the impact assessment of the industrialization from the Eastern Economic Corridor (EEC) Plan on the Bangpakong River basin, Chachoengsao Province, Thailand, focusing on the importances of the landscape in the three areas: 1) Upstream, 2) Midstream, and 3) Downstream, in order to raise awareness of all involved stakeholders in future development. The methodology of the project is mainly Participatory Action Research (PAR) by integrating Geographic Information Systems (ESRI ArcGIS) with Community Mapping to examine how the communities perceived, experienced, and valued the landscape of the areas. The surveys applied Geo-location to Community Mapping using ESRI Survey123 and complied with some information and opinions from the communities at the location. The researchers analyzed the intensity of the values and importance of each types of food security cultural landscape. The study found that the cultural landscape in the Bangpakong River Deltas has been valued and recognized by the communities who live their life and rely on the agriculture, aquaculture, and ecological services of the areas. The future urban expansion and industrial development should be concerned and encouraged to analyze the future impacts.

Keywords: Bangpakong River, Industrialization, Impact Assessment, Geo-location, Community Mapping

Midmap Community Mapping

Mind mappings from community meetings

Survey123 location on EEC Landuse map



Survey123 location map overlayed on EEC Land-use Zoning

Research on accounting method and application of ecosystem carbon sink

Xiaomin Luo, Ran Chen, Yushan Liu, Jing Zhao, Chenxi Wang
Beijing Forestry University

"Background： In recent years, the hardware and software deployment of smart cities has been rapidly implemented, and the research work on human settlements has carried out technological innovations from various perspectives based on the rapidly growing multi-source data. Multi-source data covers a wide range, such as the perception data collected by the Internet of Things, remote sensing data, site data, and network public opinion big data. Different data types complement each other and provide a comprehensive and three-dimensional data information network for the study of human settlement environment. With the rapid advancement of relevant studies on "carbon neutrality", carbon monitoring and accounting methods based on multi-source data fusion have gradually matured. Compared with the previous calculation methods based on field investigation, the multi-source data fusion accounting method can establish a richer, comprehensive, accurate and cross-scale accounting system, including the accounting of carbon reserves, carbon sinks, carbon sources and other indicators. Compared with the accounting of carbon storage, the accounting of carbon sink lays more emphasis on the process mechanism, is more closely related to carbon neutrality, and has higher value for "carbon" research.

Objective： There are various types of multi-source data used in carbon sink accounting, including vegetation, remote sensing, meteorology, soil, multi-source synthesis, artificial material data, etc. It is helpful to select more efficient carbon sink research methods to clarify the objects corresponding to each method. Therefore, this study summarized the current carbon sink accounting methods based on the classification of multi-source data, discussed the applicability of various methods in different ecosystems, and finally summarized the current research status and prospect of carbon sink accounting methods in different ecosystems, in order to provide references for establishing a more perfect carbon sink accounting system.

Methods： Literature review, comparative analysis and induction were used in this study. Based on the research on carbon sink measurement in the past five to ten years, this paper systematically summarizes the carbon sink accounting methods under the intelligent background from the perspective of multi-source data. First, the carbon sink accounting methods are summarized based on different data types, and the data are divided into ground observation data (such as vegetation, soil, meteorology, etc.), remote sensing data, model simulation data, etc. Secondly, the applicability of different accounting methods in the four different ecosystems of forest, farmland, grassland and city is discussed. Finally, the research status of carbon sink accounting method based on multi-source data fusion is summarized, and the future development direction is proposed.

Conclusion： Global warming caused by carbon emission has become a worldwide problem that needs to be solved urgently. Developing carbon sink measurement methods, clarifying the carbon source and carbon sink functions of each ecosystem service, and accurately estimating ecosystem carbon sink are of great significance for achieving carbon neutrality and coping with the global climate crisis. Based on different data types, this paper reviews the calculation

methods widely used in the field of carbon sink, which is helpful to establish a full-scale, wide range, wide application and efficient carbon sink accounting system."

Keywords: multi-source data; carbon sink accounting; ecosystem; methodology evaluation

Improved methodology for Urban Green Infrastructures in historic centres

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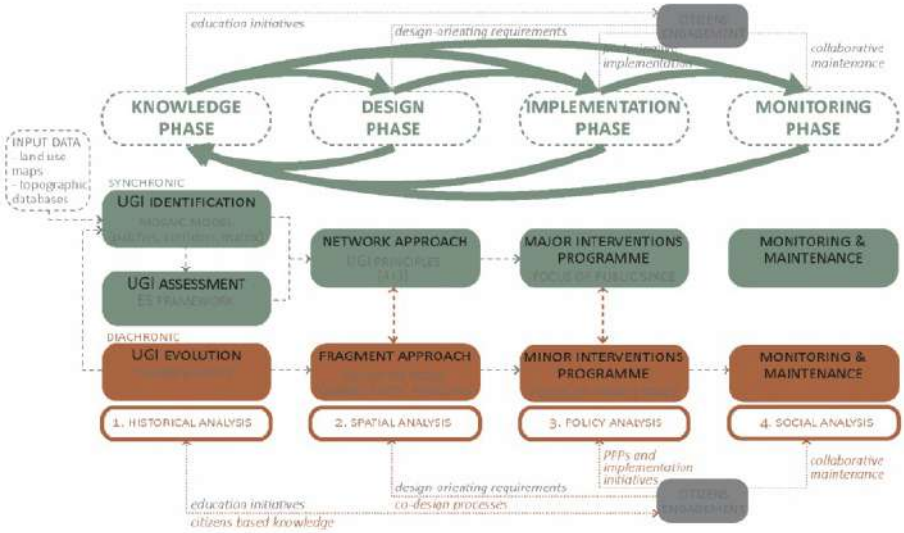
Considering the urgency of adapting urban environments to Climate Change, the role of Urban Green Infrastructures (UGI) and Nature Based Solutions (NBS) has been strongly recognized as crucial and an increasing number of research and practical experiences has involved cities in the past decades. This effort for adapting cities however is not involving all urban areas at the same level. In particular, historic centres are almost excluded from the experimentation of NBS because of the additional difficulties they pose. At the same time, historic areas are even more vulnerable to the impacts of Climate Change and Cultural Heritage is recognized as a key element for building improved urban resilience. So, there is a potential synergy with respect to the main goal of urban adaptation.
This contribution suggests an improved methodology to extend the UGI planning process in historic areas. The starting point was the synthesis of the current UGI planning process in four phases: i) the knowledge phase, which includes the mapping and assessment of the existing UGI; ii) the design phase, that currently mainly adopt the network approach; iii) the implementation phase, that corresponds to the practical roll out of the planned interventions; iv) the monitoring phase, that also includes the maintenance of the green interventions.
Then, integrative procedures were defined for each phase, with the aim of making the entire process more able of grasping the specificities of historic urban areas. In particular, the improved methodology includes the temporal extension of the knowledge phase to include the "green history" of a place, i.e. the evolution of the relationship between city and nature over time, as the starting point of the "green planning" for the future. Additionally, it is proposed to integrate and strengthen the network approach with the "green fragments" approach. This requires a deviation from the core principles of connectivity of the UGI, that was managed by identifying criteria of numerosity and proximity of the green fragments to ensure the provision of Ecosystem Services at the urban level even with separated and discontinuous interventions. The proposed methodology was defined based on extensive systematic literature review combined with the analysis of case studies across Europe. This has highlighted the correlation between the exclusion of historical centers from current UGI strategies and their exclusive focus on public space. Consequently, the proposed methodology shifts the focus from the continuous public open space to the fragmented and discontinuous system of private open spaces, which in many historical urban contexts constitute the only significant transformable margin. This entails a redefinition of the roles of the public and private sectors and the need to explore new modes of partnerships.

Keywords: Urban Green Infrastructure, historic urban landscape, urban adaptation, heritage resilience

improved methodology for UGI planning in historic centres



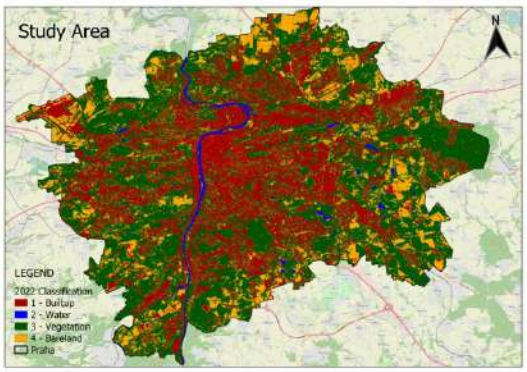
Spatiotemporal monitering of urban hot spots and land change relation

Burcu Çevik Değerli
Ondokuzmayıs University

Land change is an issue discussed throughout human history and whose impact is globally significant. Land change generally occurs by degrading natural areas and transforming them into artificial ones. The increase in land use towards impervious surfaces increases the land surface temperature, causing many meteorological problems such as Urban Heat Island (UHI) and small-scale climate change. The formation of UHI brings danger to life, increases energy demand, and has negative effects on the environment. The transformation of green areas into impermeable surfaces caused by population density and the heavy traffic load increase the thermal stress on the city. Change in thermal character of the areas, making them hotter than their surroundings. Urban hotspots (UHS) are micro-scale regions whose thermal characteristics differ according to their surroundings with land surface temperature and terrain change. These regions are extremely hot and unsuitable for human life. These spots formed due to human activities in UHI. This study detects the correlation between land change and UHS in Prague by remote sensing using the Google Earth Engine online platform. Prague, the capital of the Czech Republic, has a surface area of approximately 496 km² and a population of 1.3 million. Urban activities increase due to the density of tourists coming to the city during the summer months. Since the city's historical texture is dense, it is essential to determine the direction in which urbanization develops. For this purpose, land change was detected from Sentinel 2 satellite images. Land surface temperature (LST) for 2016 and 2020 was calculated in the summer months of June and July using the Landsat 8 thermal infrared sensor (TIRS). UHI and UHS are designated on LST maps. While the highest temperature zone in 2020 was 10.76 km², it was 7.01 km² in 2016. On the other hand, while the highest temperature measured in 2016 was 49.86 C°, it was calculated to be 44.64 C° in 2020. UHS's in Prague city center were determined by overlaying them on the Google Earth platform. For both years, the distribution of UHS was observed in common areas such as shopping malls, parking lots, train stations, and bare soil areas.

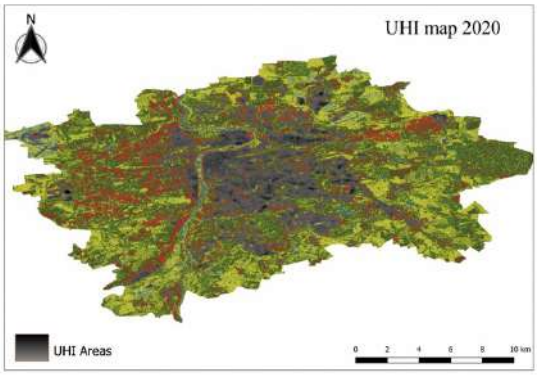
Keywords: Land change, Remote sensing, Sentinel 2, UHI, UHS

AOI



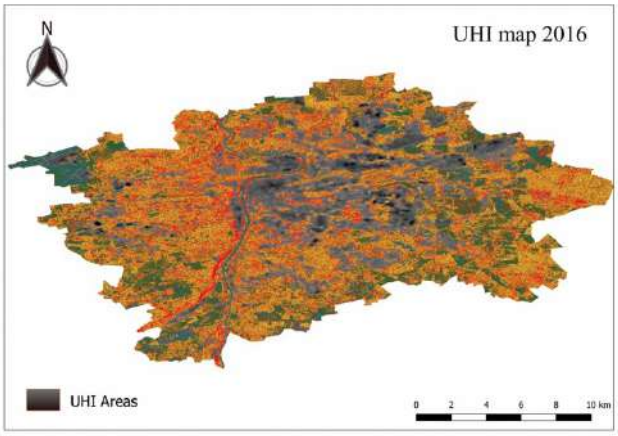
Area of interest

UHI



2020 UHI map

UHI



2016 UHI map

Projecting Community Participation: Assessing Effectiveness in Aotearoa New Zealand

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In the island nation of Aotearoa New Zealand, the reality of cultural diversity brought about by the history of migration and increased globalisation places more diverse demands on social and cultural frameworks. These diverse demands in relation to different cultures represent a range of community interests and needs, which participatory planning processes can respond to and draw out for representation in public open space planning and design. It is the community participation that is trying to create a higher sense of community for a wider range of population and ethnicity. Society should not only accept and maintain this cultural difference, it is also necessary to effectively incorporate these different perspectives from multiple ethnic groups into the community participation process.

This research aims to discover preferences for different participatory planning processes in relation to ethnicity, and to identify which are the most effective planning process for New Zealand European, Māori, Chinese and Pasifika community members. These aims are addressed by examining people's experiences of participatory planning processes and their outcomes through a sequence of focus groups. Community participation is discussed with participants from each of the four ethnic groups independently to understand how to effectively encourage sense of community in Aotearoa New Zealand. The discussions link the reasons given by participants for preferred participation methods to their cultural backgrounds. Finally, the similarities and differences of the preferences of the different ethnic groups are analysed and discussed.

Keywords: Participatory Planning Processes, Cultural Diversity, Community Engagement, Ethnic Perspectives, Sense of Community

The Effectiveness of Indices in Measuring The Naturalness of Cities

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Cities should be considered not only as human settlements but also as ecological mechanisms. In this context, it should not be forgotten that cities are dynamic structures in which active processes continue. While cities can be the source of environmental problems, they also have the potential to play a key role in solving these problems. For this reason, it should be recognized that both social and spatial improvement can be possible through changes in these areas.

However, when the ongoing urbanization processes are examined, it is clear that cities interrupt ecological functioning. Especially large cities with a population of over 500,000 inhabitants, where approximately 2.5 billion people live today, are directly related to global environmental problems with their human, sectoral and building-intensive characteristics. Moreover, these cities are defined as the most vulnerable regions against these environmental problems.

In this context, the slogan "Biring Nature to Cities" has been accepted all over the world to ensure both environmental sustainability and to increase the resilience of cities. However, there are questions about how this slogan will be realized and how it can be measured. Urban naturalness indices, which have emerged in order to measure the ecological performance of cities, are addressed with different indicators and methods in many studies. In this study, the urban naturalness indices proposed in the literature with different characteristics, the data that need to be collected to measure the indices and the methods proposed for their evaluation were examined, and it was hypothesized that evaluation criteria should be developed at the local scale. In addition, the applicability of the methods in the evaluation of urban naturalness indices within the city by taking into account the specific characteristics of the city and the differences that may arise in the stages of data collection are presented.

Keywords: naturalness of cities, urban nature indexes, urban sustainability

Agent-based modeling for nature-based water management system

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"This research aims to reveal a model that enables sustainable water use in an urban park. This model will help reduce the water usage amounts of landscape areas and the usage pressure on resources, as well as increase the sustainable use of water reserves despite the negative effects of climate change. The amount of water needed by a park depends on the seasonal variation of the water demand, the park's location, the characteristics and density of the plant species it has, the amount of water in the water reserves, air temperature, etc. How it will behave under the circumstances should be included in the calculation. All of these variables affect the water consumption of plants, and including them all in the calculation is a complex problem. At this point, agent-based modeling will analyze the complex structure. Agent-based modeling allows the behavior of individuals, institutions, or objects moving in a pattern to be modeled using a mathematical infrastructure. Agent-based modeling consists of interacting agents. It is based on the principle that agents shape each other's behavior due to their behavior, which is defined by simple rules and their interactions with other agents. The method helps solve complex problems by allowing technical calculations and behaviors to be used together. This model has a water harvesting agent and a water allocation agent, and an agent represents the landscape to be studied. The amount of water plants need can be determined by ETc.

The amount of water plants require (ETc) is calculated by multiplying the potential evapotranspiration and the Plant Factor coefficient. Differences in plant height, ray reflecting ability, soil coverage rate, and rooting cause ETc levels to change. Taking all these features into account, measuring the reference evapotranspiration (ET0) values, and multiplying them with the plants' PF (Plant Factor) values, the daily amount of water needed by the plants is calculated. Hypothetically, plants were added to the model in 4 different groups. These are Water sensitivity High (PFH), Medium (PFM), Low (PFL), and Grass (PFtG). In the plants in these four categories in the unit area determined by the model, it is necessary to add the plants in the other three categories as the Grass Area calculation. The model gives different PF values to the categories in question.

In agent-based modeling, the water allocation agent calculates the daily water need of the park by calculating ETc and makes a decision about the water distribution by evaluating this need with the source that provides water to the park. In this calculation, the water harvesting agent evaluates future needs and decides whether to integrate the water harvesting system. This model shows how the plants in the park change according to water resources under changing climatic conditions during the determined study period."

Keywords: agent based modeling, computational models, water management, complex systems.

EU&Turkiye Climate Policies from the Perspective of Landscape Architecture

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The escalating impacts of climate change have necessitated robust policy frameworks and innovative approaches in landscape architecture to foster resilience and sustainability. This study presents a comparative analysis of the European Union's (EU) and Turkey's climate policies, examining their implications for landscape architecture and urban planning. The objective is to evaluate the effectiveness of these policies in promoting sustainable landscape practices and to identify areas for improvement and potential collaboration between the EU and Turkey.

The methodology employed in this research includes a comprehensive review of policy documents, academic literature, and case studies. This is complemented by interviews with policymakers, landscape architects, and urban planners. The analysis focuses on key areas such as policy objectives, implementation strategies, and the integration of sustainable landscape practices.

Results indicate that the EU's climate policies are more comprehensive and integrated into landscape architecture and urban planning, with a strong emphasis on biodiversity, green infrastructure, and public participation. The EU's Green Deal and Biodiversity Strategy for 2030 are notable examples, promoting nature-based solutions and green urban spaces. Conversely, Turkey's climate policies are in the developmental stage, with increasing recognition of the importance of landscape architecture in climate adaptation and mitigation. However, there is a need for more explicit guidelines and integration of sustainable practices in urban planning.

The discussion highlights the importance of cross-border collaboration and knowledge exchange between the EU and Turkey. It suggests that Turkey can benefit from adopting and adapting the EU's policy frameworks and best practices in landscape architecture. Furthermore, the study emphasizes the role of landscape architects in shaping climate-resilient urban spaces and the need for policies that support innovative and sustainable landscape design.

CONCLUSIONS:This comparative analysis reveals significant differences in the integration and effectiveness of climate policies in landscape architecture between the EU and Turkey. While the EU demonstrates a more holistic and integrated approach, Turkey presents opportunities for growth and development in this area. The study underscores the potential for enhanced collaboration and knowledge exchange between the EU and Turkey, which could lead to more effective climate policies and sustainable landscape practices. It calls for a greater emphasis on the role of landscape architecture in climate policy development and implementation, advocating for policies that are inclusive, innovative, and adaptable to the changing climate.

Keywords: Climate Policy, Landscape Architecture, European Union, Turkiye, Sustainable Practices

Green Areas, Disaster and Emergency Assembly Areas in Adana

Ebru Turgut
Ebru TURGUT

Disaster is a general name given to events that cause physical, economic and social losses for people, stop or interrupt people's normal life and actions, and where opportunities are inadequate.
We can classify disasters as geological, climatic-hydrological, biological, social and technological. In disasters and emergencies, safe areas are needed where disaster victims can temporarily gather. However, meeting areas are used for temporary periods. Shelter areas such as tent cities or container cities should be created where disaster victims can meet their needs. When determining gathering areas, 7 basic criteria are evaluated together. Disaster and emergency assembly areas for Adana were determined as 240 in 2022 by the Adana Governorship Provincial Disaster and Emergency Directorate.
Earthquake parks are functional parks designed to meet emergency needs in times of disaster in areas that provide parking in daily life. When planning earthquake parks, many disaster risks should be taken into account in site selection, and at the same time, criteria regarding socio-cultural structure, climatic and topographic features should also be evaluated.
Considering the fact that we face a high risk of disaster, our country should be redesigned and enriched in terms of green areas and earthquake parks.

Keywords: Green Area, Earthquake Park, Disaster, Assembly Area, Housing Area

ORAL PRESENTATIONS
Building Bridges, Breaking Barriers: Education & Practice

Memorial Space Design Through Abstraction Of Natural Disasters

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Earth is an ever-changing planet. It can be changed by natural processes such as earthquakes, floods, avalanches, hurricanes, storms, tornadoes, volcanic eruptions, tsunamis, wild fires, droughts and other natural disaster. The image and texture of an urban area changes as a result of natural disasters which cause loss of life, property damage, economic problems and destruction of infrastructure. Thus, natural disasters are permanent events in urban memory and should be remembered.

Natural disasters are one of the biggest problems of the 21st century. Turkey which is a highly prone country to natural disasters, experienced serious losses of life and property throughout history. Hence, in order to respect the citizens who died, remind the tangible and spiritual losses in disasters and to raise disaster awareness well-designed memorial spaces are required. Memorial spaces can be designed by landscape architects. Landscape architecture education's foundation and core course is design studio. Design studio courses introduces design elements, principles and solution approaches. Besides research of design themes and contexts are required to create functional and aesthetic forms. In this context, second design studio course with a subject of memorial space design on an island was held during the spring semester of 2017-2018 academic year at the Department of Landscape Architecture and Urban Design at Amasya University, Türkiye. The aim of the course was to introduce students to the abstraction of a phenomenon to create three dimensional spaces and raise awareness of natural disasters. Abstraction has a significant role in developing the ability critical and creative thinking.

The objective of this study is to examine the design and functioning of the design studio. The study describes how research for design and abstraction of a phenomena shapes the design. The research is structured in qualitative research method and has five main parts. The first part includes theoretical framework on design studio and the aspects of abstraction and inductive reasoning. The explanation of research design and implementation of method is in second part. The third part contains description of the design process natural disaster memorial design. The fourth part constitutes analyses in detail final designs. Finally, this study outlines and discusses significant aspects in design studio and proposes an evaluation model. Results showed abstraction play a significant role in the development of students' creativity and awareness of natural disasters.

Keywords: design studio, memorial design,natural disaster, landscape architecture and urban design education,creativity

Parks in Kuwait: between historical accounts and contemporary perceptions

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In 2012, *Al-Shaheed* Park (The Martyr Park) was inaugurated to celebrate 50 years of Kuwait's Constitution which was signed into effect in 1961. As the largest park in Kuwait, *Al-Shaheed* is undergoing its third, and largest, phase which will effectively finalize its position as the Greenbelt between Kuwait City and its suburbs. Both the park's history and the long history of public parks in Kuwait are often missing in the archives and collective memories of Kuwait. Research on the current state of parks in Kuwait has recently gained scholarly attention (AlAbdulla, 2021; Alanjari, 2023; AlHammad 2022); however, the early history of public parks in Kuwait beginning with the first master plan in 1952 remains overlooked. Through historical research, this paper narrates and links together four key projects at multiple scales across time; the Greenbelt and neighborhood parks included in the first master plan; the Waterfront which was eventually constructed to include the Green Island; *Al-Shaheed* Park within the Greenbelt; and the Space Park in Al-Yarmouk. By bringing these four projects with varied scales, stakeholders, and ideas across different eras, this paper seeks to understand the shifting role of public parks in Kuwait since the first master plan. The primary sources consist of archival material that link the historical dimension with the present through surveys. The surveys are circulated through social media platforms (Instagram, X, WhatsApp) and in person, and include both multiple choice questions and open-ended questions. These surveys provide a better understanding of the role parks play in the collective memory of Kuwait's population, the current aspirations, realities, and perception of parks, and the need for landscape architecture in the design of public parks. In doing so, this paper aims to do three things. First, it historicizes the expanded, overlooked, history of public parks in Kuwait; Second, it aims to understand how parks are perceived locally by people in Kuwait, as well as what they need and desire in public parks; thirdly, it aims to develop a critical body of knowledge on the history of parks in Kuwait and opens future venues for research in arid climates and post-colonial states. Ultimately, by using both archival material and surveys to better understand the history of parks and peoples' perceptions, needs, and desires, this paper is one step closer to bridging the gap between history and practice in Kuwait and the larger Arab Gulf region.

Keywords: parks, Kuwait, perceptions, historical analysis

Anticipating the next 80 years of Portuguese Landscape Architecture

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Portugal has one of the oldest European teaching traditions in Landscape Architecture. While its antiquity enables a particular degree of maturity, what is of most interest is what these 80 years of history have given us. There is reason enough to save some time and reflect on this extension in time, questioning the roots of Portuguese Landscape Architecture education and practice and how it has evolved, if there is a clear and unequivocal acknowledgement of the discipline today and most importantly what can we envision for the next 80 years?
In this search around the hypothesis of a particular Portuguese Landscape Architecture identity, a scientific publication (in press) entitled “Portuguese Landscape Architecture Education, Heritage and Research: 80 years of History”, gathering 25 original articles from 46 contributors, was edited by the authors of this abstract. Interpreting the research entailed in the mentioned book, it is possible to recognise not only its contribution towards Portuguese Landscape Architecture accumulated knowledge but also its contribution towards the enrichment of a specific way of thinking that is rooted in cultural, aesthetic and ecological principles. Two aspects of a disciplinary approach which are here considered as particularly useful when facing today’s global crises.
Bearing in mind this important milestone that celebrates Landscape Architecture in Portugal (AA.VV., 2022), it is important critically reflect not only on the achievements and misadventures of the past but also, and just as importantly, on the future. Like in so many other areas, major concerns regarding the current global environmental, social and mental crisis are challenging Landscape Architecture towards a certain degree of reinvention. Considering these challenges, together with the emergence of the millennium generation (and following) with established digital practices and new modes of collaboration, Landscape Architecture pedagogical models and practices are being rethought and adapted in terms of content and interaction inside and outside the academic community. Indeed, there is a strong tendency for teaching to be focused on learning, through applied and applicable models, interactive and attractive, inclusive and engaging with society. An education that emphasis active methodologies that develop students’ autonomy and reasoning, through the promotion of critical thinking, problem-solving skills, teamwork and flexibility. Overall, the practical approach is being reinforced in Landscape Architecture education, endorsing the will to explore and experiment, and to learn by researching, designing, and building possibilities. Arguably, Landscape Architecture education should therefore embrace surrounding disciplinary fields, such as architecture, geography or agricultural engineering, evidencing how its disciplinary frontiers are richer and more resilient by being thick, permeable and moldable. Elaborating on a course that is more profoundly linked to the land and its people,

which, by seeking to respond to the new global challenges, will more likely attract the youth. All this ambition, seeking to ensure that the next 80 years will honour the 80 years that have passed.

References:
AA.VV. 2022. Arquitectura Paisagista: 80 anos de ensino em Portugal [Online]. Available: https://80anosap.isa.ulisboa.pt/ [Accessed 29th Sep. 2023].

Keywords: Portuguese Landscape Architecture, Education, Pedagogy, History, Future

Territory as a transdisciplinary milieu for built environment disciplines

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This study proposes a paradigm shift in how we conceive of and engage with the built environment, emphasizing the interconnectedness of architecture, landscape architecture, and planning disciplines. It argues that by placing territory at the forefront of discourse, we enrich our understanding of space and place and cultivate more inclusive, resilient, equal, and ecologically built environments for the future.

The appropriation of the term "territory" within the built environment disciplines, namely architecture, landscape architecture, and planning, signals a significant shift in conceptual frameworks. Traditionally rooted in geography and mainly elaborated in political science and law studies, the territory is now recognized as a pivotal concept shaping the design and planning processes across various scales. This study discusses territory as a transdisciplinary base and explores its multifaceted implications through the multiple theories focusing on three terms: territory, territoriality, and territorialization.

In examining multiple theories of territory, ranging from political to aesthetic to ecological and philosophical perspectives, this research highlights the diverse ways in which territory informs and intersects with the practices of architecture, landscape architecture, and planning. Each discipline offers unique insights into the concept of territory and attains different meanings to it. For the planning, territory has political and economic connotations. For landscape architecture, it has non-human and ecological meanings. Within the architecture, it is mostly related to the aesthetics of the environment. However, the disciplinary connections have yet to be fully established. While territory appears as the object of design in landscape architecture and planning, for the discipline of architecture, it mostly appears as a definition of a context. From the beginning of the 20th century, the specific interpretation of the term space, as an empty volume, is the primary object of architectural design. This study proposes a reconceptualization of volumetric space as a territory within the design process to collectively contribute to the construction of a transdisciplinary theory of the built environment.

By displacing volumetric space with territory, this study advocates for a more holistic understanding of the built environment, integrating geographical, geological, biological, psychological, and disciplinary perspectives from the scale of a room to that of the city and the Earth.
Central to this discourse is the recognition of transdisciplinarity as essential for design education and practice. By embracing territory as a unifying framework, design professionals and educators can navigate complex socio-spatial and ecological dynamics, foster interdisciplinary collaborations, and address pressing global challenges such as climate change, urbanization, and social inequality.

Keywords: Built Environment, Transdisciplinarity, Territory, Space, Earth

Adapting to emerging global dynamics in the age of environmental crises: US experience

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The 21st century has ushered in numerous challenges for both the natural and built environment, ranging from climate crises and environmental degradation to wars, pandemics, rapid urbanization, and (im)migration. While the global population surpassed 8 billion people for the first time in human history, the urbanized population now accounts for 55% of the world's inhabitants. Projections indicate that by 2050, more than two-thirds (68%) of the world's population will reside in urban areas.

While North America maintains its unique dynamics, it is no longer 'an island' and remains intricately connected to global trends. By the year 2020, the United States (US) population alone reached 330 million, and 80% of its population resided in urbanized regions, placing significant strain on both natural resources and human capital. It is estimated that 13.6% of the US population was foreign-born. According to 2018 data, US has roughly 11.4 million unauthorized immigrants and one million international students, contributing to global (im)migration. Furthermore, environmental, economic, and social changes exacerbated by events such as the pandemic, natural disasters, and sea-level rise have already begun to influence internal migration patterns.

These changes and challenges also coincide with unprecedented innovations in technology and mobility, fundamentally altering space-time relationship for all, including those engaged in landscape architecture (LA) education, research, and practice. Simultaneously, these developments contribute to a widening gap between the academy and practice. While most of us continue to act locally, we learn and practice globally through in-person experiences and digital migratory patterns reacting to planetary landscape issues and concerns.

Considering these global developments, the purpose of this presentation is to review and examine LA education, research, and practices, with a particular focus on the US, to shed light on past challenges, current contexts, and future trajectories. It focuses on how LA as an academic discipline and area of practice start adapting to global dynamics, and what are some of the lessons learned to inform future directions in the US and beyond. The research uses mixed methods and draws upon secondary data alongside the expert opinions of three LA practitioners who are ex-pats, boast extensive experience (20+ years each), and hold leadership roles within the field across three distinct institutions in different cities.

In conclusion, this presentation reveals the current and emerging power of LA as both a scholarly discipline and a professional practice with global scope. Unlike the 20th century, the 21st century witnesses escalating physical and digital mass migration patterns propelled by

environmental crises, social unrest, and economic challenges, impacting both the discipline's human capital and its scholarly trajectory. Furthermore, while LA is now recognized as a STEM discipline and bolstered by emerging digital technologies such as AI, UAVs, and Big Data, to facilitate knowledge exchange across geographic boundaries, the process of adapting to global dynamics and planetary concerns is still in its nascent stage in the US. Therefore, there is an urgent need for a comprehensive review of educational models, research directions, and digital practices to ensure alignment with global imperatives in the 21st century.

Keywords: Adaptation, Academic and Professional Practice, United States, Global dynamics, Crises & (Im)migration,

Landscape in Focus – LIF-T

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Annotation
Mayors and councillors in small and medium-sized communities do not have large teams and often lack experts in landscape and the environment. This leads to difficulties in planning and decision-making in either built-up parts or open landscape in the municipality. An important and often difficult task is public participation in decision-making. The aim of the project is to help provide information, tools and procedures that will help small municipal leaders to understand the issues of the open and built landscape and to support them in conceptual and sustainable decision-making, considering the needs of land use as well as environmental and climate friendliness. Landscape architecture offers the knowledge and tools to achieve these goals.

Aims
The aim of the project LANDSCAPE IN FOCUS is to develop know-how and increase the qualifications of representatives of small and medium-sized municipalities. The project aims to promote planning and decision-making in the landscape that should support (ecologically, economically, and socially) sustainable solutions: incorporating practices to improve biodiversity and to mitigate the consequences and impacts of climate change, but also raising awareness of the social, cultural, and aesthetic dimensions of the landscape. In the context of the project, it is possible to present landscape architecture as a key discipline to achieving the above objectives. At the same time, the project aims to stimulate interest in landscape among the wider audience.

Implementation
The project output will be a set of tools and practical information presented in the web platform LANDSCAPE IN FOCUS, which will include educational materials on landscape protection and development. The aim is to showcase tools and best practices for small and medium municipalities leading to visible outputs, linking environmental issues (especially climate change adaptation), with community development, the architectural quality, and economic sustainability. These are topics addressed by landscape architecture. A set of case studies will be created, focusing on quality solutions, but also specific narrations and paths that led to the outcome. The output will be a website and an easy-to-understand guide for mayors, councillors, and the public.

RESULTS: The output of the project LANDSCAPE IN FOCUS / LANDSCAPE FOR COMMUNITIES is to be:

- 20 case studies - examples of proven or innovative approaches of small municipalities in 4 European countries (Czech Republic, Finland, Germany, Slovakia)
- a step-by-step guide covering at least 8 key topics to provide inspiration and experience in landscape protection and development to local government representatives in a comprehensible way
- a project website including an e-learning platform with a project self-assessment tool

Keywords: landscape, rural areas, education, best practice, climate change

A pedagogical experiment: strategies for populating landscapes

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The relationship between architecture and landscape architecture, both in pedagogy and practice, forms an urgent agenda for responding to environmental crises. The formation of an interrelated pedagogical ground with shared knowledge and methods will allow both disciplines to respond to planetary environmental concerns. However, the restricted interaction between two disciplines in order to defend professional domains limits interdisciplinary collaboration. To address this challenge, as part of the "Landscape Design" course offered in the second-grade architecture curriculum, we formulated an experimental term exercise to discover creative ways of providing architecture students with landscape knowledge.

To discuss the basics of landscape environment -temporal and living- that differentiate greatly from architectural space, we formulated an ongoing term assignment called "Populating Landscapes." The assignment encouraged students to explore ways of populating landscapes that deviate from architectural scale. Considering scaleless and boundless landscape environments as an unfamiliar conception for architecture students, we prefer to begin with a known scale -building scale- and let students discover the nested scales of the landscape. We asked students to observe both the accord and the tension between the built environment and the non-human populations and put forward strategies to repopulate the landscape with all life forms. In the assignment, populating is understood as an operation and expandable method to discover the temporal and regenerative nature of the landscape. In order to experiment with the potential of the population, we selected everyday spaces reflecting various relationships between architecture and landscape.

As a requirement of the assignment, students arranged toolboxes, generated by a selection of specific sites, actions, and methods, to conduct a regenerative site reading by prioritizing time as well as different resolutions that represent landscape's nested scales. While the toolboxes guide the processes of (re)decoding the selected scales, the complementary assignments, named "pins," pave the way for a multivalent understanding focusing on the context and the time dimension. In pin 01, students re-produced section drawings of the existing sites and envisioned speculative sections that include all life forms in terrestrial and atmospheric environments, not only the ground surface. In pin 02, after selecting a representation of a landscape element from a well-known architectural context, students recontextualized the selected element through specific actions and methods. Using architectural production tools provides awareness that architects' tools are typically devoid of consideration for non-human populations. Consequently, the discipline itself is in ignorance and denial of existing landscapes and the impacts of the architectural practice on them. While pin 03 focused on the time dimension of landscape, in the final vision, which called for strategies to generate a continuous landscape in the city, students recognized that the landscapes that they are dealing with are parts of larger systems within the city. The end products, exhibiting the relationships between human and non-human populations and their cohabited environment, have aided in challenging the stereotyped perspectives of architecture students. Thus, this paper will

interpret the end products of this pedagogical experiment for the convergence of architecture and landscape in design education.

Keywords: interdisciplinarity, architectural pedagogy, populating landscape, architectural heritage

Forgetting public space - celebrating public space

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While definitions vary by discipline, a cognitive map in Landscape Architecture is a drawing of how one organizes or remembers space. These spaces may not be drawn to scale or may not include every component of the built environment, but a memory-based drawing is a key indicator of one's values and priorities. Kevin Lynch informed Landscape Architects that one can draw and organize these spaces using districts, edges, pathways, nodes, and landmarks. These cognitive maps are key indicators to a community's priorities, informing Landscape Architects means to work with a community to help it grow safely and inclusively.

Beginning in 2015, the School of Design at South Dakota State University required students, as part of a class, to ask people outside of the School to draw their version of the University campus from memory. Building upon preliminary findings, the School proceeded to ask Freshman level and Senior level students in the School of Design to draw their campus from memory. These nearly 200 students represent majors in Landscape Architecture, Architecture, Graphic Design, Interior Design, and Studio Arts. In the cold climate of South Dakota, non-designers drew buildings and major campus roads (as pathways) and parking lots. They often leave out of their drawing the historic and cultural landmarks the University promotes as well as walking pathways and green areas. While the design students' drawings follow the trend of buildings as a priority, they include more detail such as the sidewalks, the campus Campanile (bell tower), and the botanical gardens. All maps demonstrate a high priority for one's home, as the dormitories are the most drawn element of campus. Following, the members of the campus prioritize their common classroom buildings and the Student Union.

These young community members value their first place (residence), their second place (often office space, though here it is classroom space), and a shared third space (the places we choose to be; here the Student Union). Each of these environments indicate a preference for indoor spaces. In an area with climate extremes, people prioritize their indoor environments. As Landscape Architects, we have a strong calling to inform a community to the role of outdoor environments. These critical roles include water management, carbon sequestration, and ecological diversity, and should be celebrated and prioritized by the diverse people in a community.

Keywords: Cognitive Mapping, Community Priorities, Values

BOPPPS Pedagogical Model towards Cultivating Awareness of Environmental Crises

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In context of current global ecological threats, cultivating students' awareness of environmental crisis is of crucial importance. The BOPPPS pedagogical model, which is characterized by students' participation, is innovatively developed and applied to landscape architecture theory courses, and has been remarkably effective in promoting students' critical thinking about ecological restoration and social responsibilities.

The theory course *Transformative Landscapes* in Tsinghua University focuses on brownfield regeneration, covering several critical topics related to this subject, including technology, policy, arts, funding, performance, stakeholders and public participation. Multi-dimensional aspects of landscape architecture are explored, and BOPPPS pedagogical model is creatively applied.

Taking the course as an example, we track and record the whole pedagogical process and performance of all students, analyze the specific application of the core 6 components of BOPPPS pedagogical model, and evaluate its effectiveness:

1) "Bridge-in": brownfield documentaries, news and current events (B);
2)"Orienting": enhancement of students' awareness of environmental protection issues, such as brownfield regeneration (O);
3) "Pre-assessment": students' feedbacks of brownfield-related reading materials, conducting questionnaires and analyze them (P);
4) "Participatory Learning": brownfield excursion, invited presentations, thematic debates and seminars and landfill workshops (P);
5) "Post-Assessment": students' reflection through the whole course (P);
6) "Summary": retrospect discussions among the lecturer and students (S).

Based on the instructor's evaluation and students' feedbacks, we found students' consciousness and perspectives of sustainability are significantly improved, their abilities to integrate thoughts and actions are greatly strengthened, and pedagogical objectives are achieved, which provides a positive reference for the teaching of theoretical courses in landscape architecture.

Keywords: BOPPPS Pedagogical Model, Theory Course, Environmental Crises, Brownfield, Tsinghua University

Integration of the tools of landscape-architects to the architecture studies

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The architecture project, along with the urban planning and landscape architecture project, offers great opportunities for our societies to limit global warming, the disappearance of biodiversity and the overcoming of planetary boundaries. It also allows us to position ourselves at the heart of the responses to be brought to our territories to develop their resilience to the socio-environmental upheavals at work. So, how can we prepare and train young generations of architects to open up and collaborate with other actors in the design of inhabited territories, urban planners, sociologists, engineers and landscape architects? What project culture should be shared to develop dialogue and co-design?
Ecologue and landscape architect, I teach at the Grenoble School of Architecture since 2015. Participation in this congress is an opportunity to share a critical point on our pedagogical program of teaching ecology and landscape in bachelor and master degrees of Architecture. The proposition is questioning, through a selection of student works, both the relevance of the basic knowledge that is brought to them, but also that of the tools of the ecologist and the landscape architect which are proposed to them to approach the complexity of the living. We use technical tools (section, soil profiles, etc.), as well as representation tools (block diagrams, collages, etc.) or pedagogies (transects, time diagram, dichotomous keys of determinations, etc.). Our goal is to develop in students: the ability to understand landscape issues to transform them into spatiality's; to integrate environmental constraints to make them project opportunities; but also to make them aware of designing with and for the living.

Keywords: pedagogy, multidisciplinary, architecture, landscape, ecology

Work of Master 1 students in 2023 Kleio XENOPOULOU and Lucas AVICE

graphic example

A Terrestrial Words – Stock

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The postwar period (the 1940s onwards) witnessed the radicalizing and ambitious interests of spatial analysis and production disciplines in the study and organization of terrestrial ecology across a significantly wide range of scales. At the interface between knowledge and design, their endeavors expanded an operative conceptual domain within which landscape became a focal logic. Architecture's overlap with geographical-geological-ecological knowledge therein brought the question of the land system to the fore. As such, it implied a scalar shift – beyond the conventional focus on the urban towards the terrain – and a particular knowledge ontology.

Terrain, as a medium, an investigative tool, an artifact, a collective construct, and imagery, suggests a particular logic of intellection and intervention that not only upholds but also magnifies its relevance today. To operate within the spatial condition – marked by ecological urgencies and expanding scales of production – the contemporary practices of spatial production need to embrace the geographic continuum in its entirety.

This work, hereby, intends to build a collective terrestrial lexis that is to enhance the architectural embodiment of the geographical-geological-ecological. In that, it, on one side, collects words related to land, landscape, earth, life, abstract and material appropriations of geographies; and the criteria, methods, and tools exploited to know and transform these. On the other, it excavates and unearths lost words in this regard for their imaginative capacities. It, therefore, attempts to build a terrestrial words-stock that accumulates a historical knowledge base. To that end, the work builds upon close readings of a vast plethora of canonical manuscripts, monographs, and (art) works on the theme. These include but are not limited to those from Vittorio Gregotti, Benton MacKaye, Joan Gottmann, Constantinos Doxiadis, Yona Friedman, Reyner Banham, Ian McHarg, Antoine Picon, Hashim Sarkis, Mark Wigley, Mohsen Mostafavi, Charles Waldheim, and Stan Allen.

The work then goes on to discuss the extracted words' capacities to radicalize architectural pedagogy. Therein, it questions what kind of a terrestrial grasp the architect is to engage. How might this grasp operate as means of radicalizing architectural education and practice? And finally, how might architectural education blend geographical and architectural knowledge?

Keywords: Terrain, Terrestrial, Lexis, Architectural Pedagogy

Revealing The Hidden Landscapes of Halicarnassus by Incorporating Modern Technologies

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The demand for innovative approaches to educate landscape architecture is becoming more and more noticeable in context with the global environmental problems and code red alert. This study was carried out as part of the Istanbul Technical University's Department of Landscape Architecture's 2023–24 Spring Semester graduation project.

Archaeological landscape studies have gained more attention in recent years in academic literature. However, there is a shortage of research that detail the design process of archeological landscapes. This study seeks to reveal the historical, cultural, and architectural layers of Halicarnassus in order to influence the future development of Bodrum city by considering its current natural and cultural characteristics. This study's distinctive feature is in its development by senior students of ITU landscape architecture.The investigation focuses on the city's archeological heritage and how the earth's surface was deeply incorporated into the urban fabric to create a remarkable defensive system. With the objective to design landscapes, students will perform an in-depth examination of ancient sites utilizing rapidly developing new technologies including drone shooting, orthophotography, and 3D mapping. Experts obtained data during fieldwork while students observed the procedure, and they utilized the resulting data to study the specific historical characteristics of the archeological sites. The exploration provides a broad perspective on how historical ruins have the potential to impact and enlighten the contemporary design of cities and environmental sustainability in this way.

Through addressing immediate and wildly increasing seasonal population density, construction, and unplanned interventions in the natural structure, this teaching model, which focuses on landscape architecture education, aims to generate design solutions with a perspective of responsible and contemporary design solutions that respect the nature, history, and archaeology of Bodrum and maintain a balance between conservation and use. This study demonstrates how incorporating modern 3D mapping technologies and drone photography grounded in historical and cultural legacy may better prepare and raise students' awareness of environmental concerns, therefore influencing the direction of landscape architecture education.

Keywords: Landscape Architecture Education, Archaeology, Halicarnassus, 3D Mapping, Drone Photography

An exploration through education: Landscape architecture in Kenya and Sweden

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OBJECTIVE: This study evaluates the on-going collaboration with a consolidated group of teachers and researchers who have expanded their teaching activities to embrace landscape architecture across two countries: Kenya and Sweden. The overall objective is to build capacity within the global teaching community of landscape architecture to accomplish the SDG-goals through exchanging knowledge, experiences, pedagogics and perspectives between the Global South and North.

Background
How we empower our young generation in landscape architect programs around the world, will most likely affect not only their career decisions in the future but also the direction of the profession. The interdependencies between the local and global becomes specifically tangible when we collaborate on sites across the globe. A pedagogical framework for effective and invaluable appreciation and knowledge of how transdisciplinary and system approach is integral for obtaining sustainability and global health is created when students meet from different cultures to work on specific challenges such as complex water related issues whilst taking into consideration different social, political and climatological contexts.
In January 2023, we initiated a pilot where we tested a collaborative model of teaching in teams across the globe using primarily digital technologies (such as films, zoom and other forms of software). The teaching activities we piloted were the result of a collaboration between the Landscape department of Jomo Kenyatta University of Agriculture and Technology (JKUAT) in Nairobi, Kenya and the department of Landscape Architecture, Planning and Management at SLU, Sweden. Professional institutes such as Architects Sweden (Sveriges Arkitekter, SA) and Architectural Association of Kenya (AAK) and UN-Habitat contributed to this cross equatorial initiative. The course was designed to enable students from both countries to work collaboratively on two sites, one in Nairobi, Kenya and another in Malmö, Sweden. Students explored nature and culture based solutions for communities around Nairobi dam within Kibera, one of the largest marginalised urban settlements in the world and then looked at the possibilities of rehabilitating the brownfield waterfront industrial site of Nyhamnen in the burgeoning metropolis in Sweden (Blogg.slu.se/global-blog). The Kenyan students and faculty took the Swedish students on digital site visits and vice versa. The project also entailed for two physical meetings which enabled two teachers from Sweden to visit Kenya in February 2023, and two Kenyan faculty members and two students to visit Sweden in March.

Method
A compilation of material from the implemented courses: Films, documents, student achievements and other materials will be discussed. The overall objective is to build capacity within the global teaching community of landscape architecture to accomplish global agendas through exchange between the Global South and North.

Discussion/conclusions
The study demonstrates how knowledge can be exchanged through experience whilst breaking environmental, economic and socio-cultural barriers to find holistic, integral solutions to global issues at local level.
Enabling continuing future physical meetings is crucial to accomplishing long-term cooperation and appreciation of our joint endeavor in the field of landscape architecture through discussion around the experimental space that such collaborative projects offer in broadening our education system.

Keywords: Pedagogy, Exchange, local-context, global-agenda, water

Geodesign as a participatory tool for adaptive strategies

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Climate change adaptation is a global challenge common to all urban agglomerations. Despite the technological development that allows a greater understanding of the territory based on collected data, it was found that technocratic (top-down) solutions are not efficient. Adaptive approaches require multi- and transdisciplinary solutions, involving multiple scales, different levels of governance, and popular participation. They pose a challenge for both the population and policy developers. Geodesign presents itself as a promising method for the co-creation of adaptation strategies. This is because it is based on the application of processes to solve complex design problems involving local people and design professionals, through geographic sciences and information technologies. Geodesign South America (GDSA) is an international congress that takes place every two years to disseminate the Geodesign method to academics and professionals in the areas involved with the planning of the territory, as an opportunity to share the results of projects that use it. This article aims to present the results of the workshop conducted at the event held in Fortaleza, Ceará, Brazil in the year 2024 by the Federal University of Ceará, which had the adhesion of a diverse group of researchers, of members of the local government and of Professor's Carl Steinitz team, creator of the Geodesign method. The Urucutuba watershed, located in the state of Ceará (Brazil), was the object of study of a workshop that sought to plan strategies for the management of urban waters, aiming at the sustainable development and resilience of the region. Results showed that the knowledge of specific conditions of the place, allied with participation of multiple actors, promotes the use of systemic, comprehensive, and integrative solutions. The diversity and quality of responses suggest the need for a team equally heterogeneous and immersed in the context. In addition, the workshop demonstrated the importance of understanding local scale in planning climate change adaptation strategies. Thus, this collaborative process of building the territory can be understood as an appropriate tool for the development of diagnoses and proposals, in addition to having an educational role for the population in understanding the interactions between planning scales.

Keywords: Geodesign, Co-creation, Adaptive strategies, Climate change

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