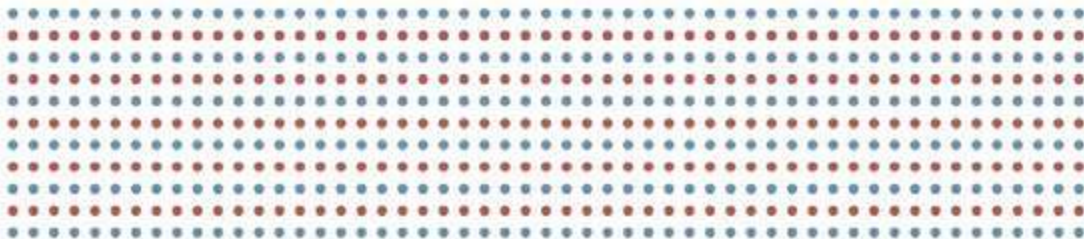




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GAME CHANGER? **PLANNING FOR JUST AND SUSTAINABLE** **URBAN REGIONS**



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Table of Contents

Track 01: Postgrowth	15
Xin Li & Ting Yang, Urban Planning In The Post-Growth Era: Insights From World Bank Indicators	16
Karin Holmstrand, Planning Beyond Growth: A Case Study Of Wellbeing-Oriented Planning In Wales And Cornwall	50
Siwei Peng & Lu Yufei Na, Research On Rural Revitalization Planning From The Perspective Of Ecological Capitalization: Taking Nuanshui Township As An Example	69
Wei Wei, From Howard’s Garden City Movement To Zero-Carbon New Towns In The Postgrowth Era: The Case Of New Town Development In The Context Of Carbon Neutrality Of Shanghai	83
Jinyi Wang, Shijie Sun & Xiaoyu Cong, The Internet As A Business Game Changer: A Study On Invisible Consumption Spaces In Nanjing Old City	94
Federica Fiacco, Kezala Jere & Gianni Talamini, Can Fast Urban Growth Be Low-Carbon? Sub-Saharan Cities Towards New Territorial Strategies	110
Qiang Yao, Research On Strategies For Enhancing Urban Spatial Resilience In Shanghai Based On The Connotations And Characteristics Of ”Resilient Cities”	128
Qiang Yao, Na An & Qingji Shen, Research On Strategies For Enhancing Urban Spatial Resilience In Shanghai Based On The Connotations And Characteristics Of ”Resilient Cities”	151
Giulia Luciani, Nature Is (Not) Democratic. Notes For A Community-Based Approach To “Natural Resources”	174
Chiara Pisano, Adriana Galderisi & Giada Limongi, What Practices To Overcome The “Cultural Remoteness” Of Inner Peripheries? A Focus On Italian Case Studies	186
Dongdong Chen, Micro-Intervention As A New Approach For Urban Regeneration In Metropolises: A Case Study In Beijing	203
Track 02: Markets	216
Alberto Bortolotti, Urban Policy Financialisation In Mega-Projects. The Case Of Milano Innovation District	218
Alberto Bortolotti, Large-Scale Urban Development Projects As A Dilemma Affecting The Housing Crisis. The Case Of Milano Porta Romana	235
Pauline Gali, Approaching Urban Renewal Through The Lens Of Urban Rent Theory	249
Emanuele Garda & Marta Rodeschini, Public-Private Dialogue In The Cultural Reuse Of Historical And Architectural Heritage: The Example Of The Carmine Monastery In Italy	265
Track 03: Law	278
Guangkun Zhou, Fallacies And Revisions: Evaluation Of Economic Benefits Of Development Rights Transfer And Density Bonus –17th And 69th Neighborhoods In Shanghai Hongkou Historic Conservation Districts Regeneration As The Case	280
Zhiyu Pang & Yacheng Song, A Framework For Analysing Physical Form Outcomes Of Value Capture Paths Of Regeneration Projects In Residential Historic Areas	305
Sara Benkirane, Navigating Complexity: Exploring Land Planning And Management Challenges In Morocco	317
Li Wang, Can Transferable Development Rights Be Applied In The Chinese Context? — A Comparative Study Between China And The United States	336

Carolina Giaimo, Principles And Rules For Spatial Planning Governance And Government In Italy	353
Ines Calor, Martinho Augusto & Mateus Magarotto, Land Readjustment In Braga Municipality - Looking Into The Future, Learning From The Past	365
Linlin Dai, Changwei Feng, Jian Lin & Yun Liu, Multi-Planning Integration: Construction And Progress Of China's National Territory Spatial Planning System	383
Chenli Qian, Yi Huang & Xiao Wu, A Comparative Study On Zoning Guidelines For Different Planning Types In China	400
Zhao Zhao, Study On The Response Of Local Legislation To Coordinate The Interests Of Multiple Subjects In Urban Renewal From The Perspective Of Property Rights . . .	411
Track 04: Borders	428
Yifan Cai, The Evolution Of Spatial Planning In The Border Area Between Shenzhen And Hong Kong, China	430
Wenbo Xu & Shengbo Zhao, Administrative Boundary Effects Of Cross-Border Migration Of Manufacturing Enterprises: A Case Study From The Pearl River Delta In China	444
Yuxiao Ma, Jianzhong Huang, Qiao Zhang & Jing Deng, Coordinated Optimisation Of Multi-Level Rail Transit Network And Regional Spatial: International Contextual Differences And The Case Of Shanghai	462
Rodrigo Vielmo Moura, Analysing Local Cross-Border Cooperation In Fragile Peripheral Areas In Northern Italy	479
Lin Tian & Yao Cheng, Core-Periphery Industrial Linkages Of The Metropolitan Area From The Perspective Of Enterprise Linkages: The Case Of Three Cities Adjacent To Shanghai	497
Yin Dou & Yihao Zhang, Study On The Characteristics Of Regional Intergovernmental Relationships Network, Based On The Analysis Of Planning Texts	515
Andrés Martínez & Pere Fuertes, «The Franco-Spanish Mediterranean Strip. An Opportunity To Turn Applied Research Into Trans-Border Planning»	523
Flore Guichot, Transit-Oriented Development In Asymmetrical Context: Learning From Cross-Border Paradoxes In The Great Geneva.	539
Track 05: Mobility	561
Kaichen Zhou & Lan Wang, Deciphering The Scaling Laws And Spatial Structure In Urban Micro-Mobility: Empirical Evidence From Bike-Sharing In Shanghai	563
Jia Yi Liu & Yanbin Li, Exploring The Assessment And Strategies Of Street Inclusivity In Suzhou, China	576
Arne Markuske, Urban Peripheries And The 15-Minute City	594
Junting Lin, Zhiwei Li, Huali Zhang & Yu Zhuang, Form Follow Mobility: A Method To Identify Potential Urbanization Area In The Over-Rail Plane Under The Orientation Of Station-City Integration And Pedestrian Priority	613
Ayesha Anwar & Hong Leng, Stepping Towards A Sustainable Future With Tod: Evaluating The Potential Of The Lahore City For A Regional Policy Reform	627
Yunjing Wang & Yu Zhuang, Layout Patterns And Crowd Flows Of Commercial Space In High-Speed-Rail Station Complexes	650
Sota Aida, Hirokazu Abe, Noriko Otsuka, Akira Takahashi & Kensuke Yasufuku, The Evaluation On Walkability In An Aging Society: The Case Of Senri New Town, Japan	671
Giovanni Fusco, Meta Berghauser Pont, Valerio Cutini & Angelika Psenner, Guiding Principles For The 15-Minute City In Peripheral Areas: The Emc2 Model.	690

Cédric Wehrle, Spaces Of Automobility: Diverging Trajectories Within The Liège-Aachen Diffuse City	708
Jan Bittner, Accessibility Of Local Amenities To Reduce Car Dependency: Obsolete Concept Or Change Yet To Come? The Prague Case.	719
Yunjing Wang & Yu Zhuang, Layout Patterns And Crowd Flows Of Commercial Space In High-Speed-Rail Station Complexes – Take Three Chinese High-Speed-Rail Station Complexes As Examples	732
Arzu Erturan & Bahar Aksel, Being A Child On A Car Free Island: Exploring Independent Mobility And Children’s Perception In Büyükkada-Istanbul	755
Hana Elattar, Arjama Mukherjee & Jörg Rainer Noennig, Stakeholders Of Participatory Planning: A Comparisonbetween Megacities And Cities In Europe	771
Michelangelo Fusi & Michela Tiboni, The Role Of Urban Planning In Perceived Accessibility To Public Transport	788
Miruna Draghia & Valentina Stan, Exploring Transformations In Sustainable Urban Mobility: Insights From Citywalk 2.0 Project And Beyond	804
Track 06: Governance	820
Camilo Vladimir De Lima Amaral, Antonio Di Campli, Srivastava Rishabh & Elisa Verri, Conflictual Natures: The Role Of Architectural Imagination In Building Paths For Ecological Transition In The City Of Goias – Brasil	822
Yanxia Mu, Feng Luan & Jiahui Fan, Study On Governance Model Of Multi-Subject Participation In Rural Industry Development – A Case Study Of Shanghai Rural Revitalization Model Village	850
Kaixuan Lin, Jieming Zhu & Min Zhou, A Study On The Integrated Governance Model Of Development Zone And Town: Take South Jiangsu Region Of China As An Example	856
Pan Hu, Keyi Sun, Jialu Cheng & Yu Shi, Evaluation And Spatial Governance Strategies For Old Residential Areas’ Renewal And Reconstruction In Urban Downtown Districts: A Case Study Of 70 Old Residential Areas In Changzhou ,China	882
Pieterjan Schraepen & Joris Voets, How To Deal With Conflictual Central Policy Incentives? Regional Governance Dynamics In Flanders Unpacked.	899
Robin Neef, Wim Leendertse, Stijn De Koning, Jildou Gerritsen & Rebekka De Witte, Tensions In The Original Premises Of The Iad Framework Compared To Contemporary Spatial Applications: Revisiting Elinor Ostrom	914
Zhuyang Liu, Wenxiao Yang & Beiyin Ni, Enterprise-Led Or Government-Led? Research On The Characteristics And Mechanisms Of Rural Gentrification In Metropolitan Suburbs Driven By Significant Projects Taking Lianmin Village In Shanghai As An Example	930
Na An, Chenyu Huang & Jiawei Yao, Awareness And Willingness Of Chinese Households To Reduce Carbon Footprint In Daily Life	940
Hana Elattar, Stakeholders Of Participatory Planning: A Comparison Between Megacities And Cities In Europe	958
Giulia Spadafina, Planning For Proximity In A Fragile Urban Context. The Case Of Tirana	973
Verena Lenna, The Publicness Of Urban Commons. Insights From The Brussels Commoning Scene.	987
Sarah Isabella Chiodi & Lorenzo Liguoro, Urban Development Strategies: Navigating The Complexities Of Multi-Level Governance In Northern Italy	1003
Marida Borrello, Tiers Lieux And Wijkhuubs: Infrastructures For A “Situated Democracy”	?1023

Track 07: Environment And Climate**1042**

Zhenpeng Zhang, Fang Fang, Andrew Greenlee & Jiankun Lou, Urban Heat Mitigation Effect And Affordable Housing Greenery Injustice Measured By Green View Index (Gvi): A Case Study In Washington, D.c.	1044
Zhenpeng Zhang, Fang Fang, Andrew Greenlee & Jiankun Lou, Urban Heat Mitigation Effect And Affordable Housing Greenery Injustice Measured By Green View Index (Gvi): A Case Study In Washington, D.c.	1065
Ruonan Jia & Zuobin Wu, Research On Spatial Optimization Strategies Of Rural Settlements In The Loess Plateau From The Perspective Of Disaster Prevention And Reduction—A Case Study Of Gaoxigou Village,China	1086
Sadaf Pirouzi, Fabiana Fabri & Loïc Sauvee, A Gis-Based Method For Prioritising Brownfieldstransformation Into Multifunctional Urban Greeninfrastructure: The Case Of Rouen Metropolis	1097
Luciano Agustin Pana Tronca, Climate And Transport Planning: A Messy Junction . . .	1105
Lucrezia Gelichi, Chlorophyll City: Regenerative And Restorative Urban Planning For A Sustainable Future Through Extensive And Branching Reforestation Initiatives . . .	1117
Beatriz Condessa & Rita Nicolau, Comparative Analysis Of Net Land Take In Portugal's Metropolitan Areas	1130
Jiankun Lou, Lan Wang, Jiayu Li & Yinghui Jia, How Urban Morphology Affects Wind-Heat Environment: An Example In Beijing From Ancient Cities To Modern Cities .	1140
Karina Landman, Regenerative Public Space As Game-Changing Option For Thriving Communities	1154
Christian Großhauser, „Potential Of Hydrogen Production By Wastewater Treatment Plants (Wwtps) - Technologies, Benefits, Challenges And Limitations Using The Example Of The Wastewater Treatment Plant Straubing“	1169
Caroline Andersen & Martin Schulwitz, Assessing Regional Potentials For Green Hydrogen Infrastructure Planning In Germany	1187
Giulio Giovannoni, Removing Cultural Barriers To Climate Change Adaptation In Tuscany	1202
Roberta Pistoni, The Increasing Entry Of The Energy Subject In Spatial Planning Policies: New Visions For Energy Landscapes	1216
Apostolos Lagarias, Re-Definition(S) Of The Role Of Central Business Districts Under The Effect Of Extreme Heat Conditions And Climate Change: Evidence From The Mediterranean Context	1232
Lucila Urda Peña, Javier Julio Malo De Molina & Emilio Ontiveros, Analysis And Evaluation Of The Quality Of Open Spaces And Green Zones In Periurban Landscapes, The Greengates As Strategic Nodes Of Green Infrastructures.	1249
Krystallia Kamvasinou & Lorenzo Stefano Iannizzotto, Rethinking The Waste Of Planetary Urbanization For Urban Challenges: Potential, Strategies And Governance In Terrain Vague Projects	1269
Giulia Giacche, Anais Mohamed, Jean-Noël Consalès & Romain Melot, An Analysis Of Current Integration Of Urban Agriculture And Domestic Garden Into Urban Planning: The Case Of Île-De-France Region	1286
Evangelia Athanassiou, Planning Tools And Building Regulations Towards Greening Densely-Built Greek Cities: Scales Of ‘Urban Green Grabbing’	1300
Emanuele Garda, Greening The Void: Actions For The De-Sealing And Renaturalisation Of Soils In Brownfield Regeneration Processes	1311
Margarida Calmeiro, The City Of Tomorrow Is Already With Us	1323

Ani Tola (Panariti), Paul Louis Meunier, Teuta Peshkopia & Geri Bisha, Strategies To Mitigate The Urban Heat Island Effect In Mediterranean Promenades Of France, Italy, And Albania	1334
Vidhulekha Tiwari, Ram Avtar, Santanu Bandyopadhyay & Arnab Jana, Quantifying The Effects Of Spatial Determinants Of Cooking Fuel Choices In India	1357
Alan March, Anna Hurlimann, Sareh Moosavi & Judy Bush, The Built Environment Policy And Practice Context To Facilitate Climate Change Action - The Role For Planning And Design	1371
Giovanni Ottaviano & Luciano De Bonis, The Self-Government Approach To The Planning Of The Gran Sasso Laga Park	1388

Track 08: Public Space **1398**

Ifigeneia Kokkali, The Open Orchestra Project In The Public Spaces Of Athens: An Urban Utopia With Transformative Power?	1400
Brigida Proto, On Freedom, Public Space And Women’s Experiences Of Prostitution. The (In)Visible World Of The Bois De Vincennes In Paris.	1415
Yu Zhang & Qiang Sheng, Study On Spatial Distribution Of Fresh Supermarket Based On Street View Data	1429
Christine Mady, Repurposing Abandoned Transport Infrastructure Towards Social Inclusion: The Case Of Baana, Helsinki	1442
Francesca Dal Cin, Cristiana Valente Monteiro, Nawaf Al Mushayt, Maria Ines Franco, Maria Matos Silva & Sérgio Barreiros Proença, The Public Space Between Land And Sea. Quarteira’s Case	1469
Pelin Işık & Christa Reicher, Playful Urbanism In Diyarbakır: Dynamics Of Power And Play In Public Space Design	1485
Ash Ulubaş Hamurcu & Fatih Terzi, Exploring User Preferences And Place Attachment In Urban (Public) Spaces: A Case Study Of Kadıköy Historical City Centre, Istanbul, Türkiye	1505
Yiting Jiang, How Social Media Influences Rural Spatial Practice And Place Identity: A Case Study Of Fuling Village	1523
Yan Zhou, Xinjie Shen & Hong Jiang, Continuing Community Spirit: Study On The Public Space Of “Pu-Jing” Community In The Ancient City Of Quanzhou	1537
Qianhui He, The Impact Of Online Social Activities On Public Spaces In The Digital Era - A Case Study Of Guochuang Park In Nanjing	1551
Giulio Giovannoni, Enhancing Suburban Life With Victor Gruen	1569
Ina Macaione, Alessandro Raffa & Bianca Andaloro, Design Climate-Adaptive Urban Green Regeneration: Nbs Strategies For Future-Proof Streetscapes	1578
Karla Barrantes Chaves, Nida Cruz Zúñiga & Erick Centeno Mora, Urban Parks Through People’s New Lens: Opportunities Behind Covid-19 For Public Spaces’ Policies In Costa Rica.	1605
Catarina Todorovic Caldeira & Ljiljana Cavic, Heterotopic Pocket Spaces Through Intermittent Occupancy	1623
Gregorio Pezzoli & Emanuele Garda, Designing The ‘Right To Mobility’: A Holistic Analysis To Rethink The Public City And Fighting Heat Waves In Urban Areas	1633
Kundani Makakavhule & Kwazi Ngcobo, In The Name Of Peace, Sanitise!	1644
May Saeedi, Tom Jefferies & Sean Cullen, Analytical Study Of Hospitality Culture And Urban Identity And Its Impact On The Future Of Marine Tourism In Red Sea Coastal Port Cities: Case Study Of Jeddah Saudi Arabia.	1659

Track 09: Inclusion	1680
Dongyu Zhang, Hong Leng & Ziqing Yuan, Research On The Psychological Health Impacts For Children In Urban Built Environments	1682
Mengyao Zhang & Pan Hu, Study On The Comparison Of Development Efficiency Between Inner And Outer Urban Circles And The Balanced Development Strategy Of Marginal Areas: Analysis Based On The County Scale Of Chongqing	1694
Zsófi Veres, Maintain Temporal Dynamics: What Temporal Characteristic Needs To Be Preserved Within The Historic Marketplaces Of Palermo To Encourage Sustained Interactions?	1716
Xiaohu Zhang & Haixiao Pan, Equity In Essential Services Accessibility Among The Elderly: A Comparison Of Community Resilience During And After The Covid-19 Pandemic	1735
Zihao Chen & Yifan Yu, Study On Youth Friendly Urban Renewal Strategies From An Inclusive Perspective	1755
Yinghui Jia, Lan Wang & Jiankun Lou, Dispersed Urban Spatial Structure And Increased Urban Greenness Could Reduce Intra-City Health Inequalities In England	1766
Yajun Wen & Yifan Yu, Exploring Colour Planning Strategies For Children’s Outdoor Playgrounds In Communities: An Analysis Of Children’s Diverse Preferences In Shanghai, China	1777
Xiaojie Shen, Enhancing Social Interaction In Urban Spaces: The Role Of Vertical Greening Systems In High-Density Areas	1785
Rebecca Staats, Can Care Help Conceptualise Place Futures? Exploring The Potential Of Care As An Analytical Framework For Understanding Place Qualities	1797
Xiaojie Shen, Enhancing Social Interaction In Urban Spaces: The Role Of Vertical Greening Systems In High-Density Areas	1814
Xiaojie Shen, Enhancing Social Interaction In Urban Spaces: The Role Of Vertical Greening Systems In High-Density Areas	1826
Krity Gera, Peter Hasdell, Gerhard Bruyns & Diego Sepulveda Carmona, Exploring New Methodological Approaches To Mapping Socio-Spatial Mobilities	1838
Yun Yu & Yi Huang, How Are Youth Living In Ageing Neighbourhoods? A Case Study In The Central District Of Shanghai	1855
Angelina Grelle, Embracing Diversity: Ararat’s Role In Inclusive Urban Development And Migration In Rome	1867
Carla Baldissera, All-Round Walkability Condition To Primary School In Milan	1878
Ye Zhan & Yifan Yu, Innovative Tools For Building Child-Friendly Communities: The Development And Application Of Child-Friendly Neighbourhood (Cfn) Built Environment Audit Tools, Insights From Shanghai	1890
Track 10: Education	1912
Yujiao Wang, Xiao Wang, Chenyi Cai & Peng Tang, Deep Learning-Driven Morphological Dataset And Analysis Methods For Chinese Campuses	1913
Xueling Wang, Dynamic Visual Assessment Of Urban Streetscapes: Hengshan Street In Shanghai As A Case Study	1932
Katarzyna Rędzińska, Geospatial Virtual Reality And Planning Ar Laboratory For Education In Spatial Planning	1955
Anna Kaczorowska, Emiliya Popova, Günther H. Filz & Dorota Kamrowska-Zaluska, Building Tomorrow’s Urban Futures: Reflections On The “Builddigicraft” Project And The Pursuit Of High-Quality “Baukultur” In Higher Education.	1965

Aleksandra Stupar, Ivan Simic, Vladimir Mihajlov & Aleksandar Grujic, Embracing The Green Curricula? The New European Bauhaus As A Driver Of Environmental Change In The University Education	1984
Track 11: Housing	1997
Miao Hu, Housing Improvement In Historic Districts Oriented Towards The People’s ‘Sense Of Gain’ A Case Of Shanghai, China	1998
Lin Zhou & Chen Chen, Towards An Inclusive And Developmental Housing Regime In Chinese Megacities? Evidence From The Implementation Of The Affordable Rental Housing Programme In Shanghai	2007
Jiwen Han & Li Bao, Dynamics, Mechanisms, And Benefits Of Micro-Renewal In Urban Residential Areas A Case Study Of The Xiaoxihu Block In Nanjing	2027
Muzeyyen Anil Senyel Kurkcuoglu, Evaluation Of Fuel Poverty In Urban Regeneration Areas: A Case Study Of Ankara, Türkiye	2046
Teresa Frausin & Elisa Mariavittoria Bertolini, On Housing Affordability. Questioning The European Policy Perspective In Action	2058
Hee-Jung Jun & Jeong Hyun, Social Capital Among Public Housing Residents: A Comparative Study Between Mixed-Income Communities And Independent Public Housing	2082
Qianzheng Geng, Ziming Wang, Jiaying Cui & Weizhen Shen, How Shanghai’s Urban Heritage Conservation Plan Loses Effect? Paradoxical Governance Goals And Disparities In The Regeneration Of Residential Historic Neighbourhoods	2101
Jiaxin Qi & Yuhang Rao, Research On Informal Residential Space Under Viaducts In Shanghai: From The Perspective Of Socio-Spatial Transformation	2128
Elena Marchigiani & Valentina Novak, Rental Affordability, Housing First And Beyond. A Focus On The City Of Trieste (Italy)	2141
Gonçalo Antunes, João Seixas, Rui Pedro Julião, Jorge Ferreira, Margarida Picanço & Cristina Morgado, Housing Prices In Portugal And The Covid-19 Pandemic	2168
Track 12: Futuring	2187
Liangkai Deng & De Wang, Individualized Perspective On Spatial Restructuring Of E-Commerce Villages: A Case Study Of Village Q In Shaanxi Province, China	2189
Enze Zhang & Jiaying Huang, Study On The Evolution Characteristics And Collaborative Governance Strategies Of “Production-Living-Ecological” Space At County Level In Loess Hills And Gully Areas–Taking Huangling County As An Example	2200
Elisabetta Vitale Brovarone, Loris Servillo & Alys Solly, Backcasting As A Tool For Governing Transitions Beyond Techno-Solutionism: The Torino2050 And Tomove Projects	2213
Melih Birik & Bahar Aksel Enşici, Projecting The Future: Scenario Building And Storytelling For Holistic Perception Of Future Context.	2223
Lea Petrović Krajnik, Damir Krajnik, Lucija Kustić & Marta Marelić, Scenario Planning Method In Conceiving Future Development Of Peripheral Areas: Island – City – Spatial Interconnecting For The Sustainable City Of Tomorrow	2237
Camilo Vladimir De Lima Amaral, Antonio Di Campli, Srivastava Rishabh & Elisa Verri, Utopias As A Design-Thinking Key For Counter-Hegemonic Ecological Transitions	2256
Jan Schreurs, Integrating Metaphors For A Planning Ecology. Evaluating The Work Of A Local Quality Platform	2275
Antti Roose & Pille Metspalu, Unravelling A Sustainability Vision In The National Spatial Plan	2294

Miguel L. Navarro-Ligero, Francisco García-Triviño, Manuel Pérez-Docampo & Julio A. Soria-Lara, Prototyping Future Scenarios For Urban Planning Through The Production Of Virtual Reality Scenes	2306
Kersten Nabielek, David Hamers & Rienk Kuiper, Spatial Scenarios As A Tool For Future-Proof Spatial Planning In The Netherlands	2320
Track 13: Theories	2334
Yosef Jabareen, Theorizing State Dispossession Planning Vs. Community Self-Determinative Planning: The Case Of The Al-Bostan Palestinian Community Struggle Against The Israeli Planning In East Jerusalem	2335
Siling Chen, Jianing Shi, Jingxin Wang & Jianzhong Huang, Reviewing The Applications And Prospects Of The Concept ‘Image Of The City’ In Urban Planning Research . .	2355
Loukas Triantis, Planning As Magma. Suggestions From The Work Of Cornelius Castoriadis	2367
Elli Papastergiou, Athanasios Kalogeris & Georgia Pozoukidou, Subjective (Social) Well-Being In The Neighbourhood: A Conceptual Exploration	2382
Thomas Buhler, Isabelle Chesneau & Annabel Richeton, Since When Has Regional Planning Been Vague? An Analysis Of Textual Data From 7 Regional Master Plans Of Ile-De-France Region Between 1939 And 2019	2399
Jarre Parkatti, Reconnecting Planning Theory With Urban Design: Public Space As A Social And Architectural Concern	2416
Yanyun Mao & Jian Zhuo, Adaptive Planning In China: Research Progress, Implementation Effectiveness, And Future Prospects Based On Knowledge Mapping And Meta Analysis	2430
Track 14: Policy Mobility	2451
Florence Bousquet, Exportation Of The Parisian’s Urban Knowledge (1976-2005)	2453
Katerina Christoforaki, Post Covid19 Topiography: Prospects Of The Polycentric Operational Model For A Greek City.	2468
Yue Zhang & Siling Chen, Optimizing Land Resource Allocation And Functional Configuration In High-Tech Industrial Parks: A Case Study Of Chengdu Xinchuan High-Tech Innovation Park	2482
Daniele Soraggi & Valentina Costa, Ligurian Transfer: When Territorial Constraints May Hamper Mobility Policies Replicability	2493
Ludmila Kolouchova, From Global North To Global South: Exploring Creative City Policy Mobilities And Their Urban Impacts	2508
Sara Nafi, Transit-Oriented Development Approach To Social Sustainability, Doha City As A Case Study	2524
Ludmila Kolouchova, From Global North To Global South: Exploring Creative City Policy Mobilities And Their Urban Impacts	2539
Track 15: Histories	2555
Xiaoxi Guo & Sihan Yang, Retaining Industrial Heritage Publicness: The Interrelationship Of Industrial Heritage And Public Space	2556
Beini Guo, Research On The Protection And Development Of Industrial Heritage In China And Europe Under The Background Of Urban Renewal—The Case Of Hanyeping Company	2593
Jie Tang, Xiaoqi Ye & Haidong Zhou, Research On Sustainable Protection And Inheritance Of Overseas Chinese Hometown Cultural Heritage: A Case Study Of Xiangshan Ancient City	2610

Yimin Wei, Zuobin Wu, Weining Shi, Chao Ma & Wendi Dong, Study On Refining Historical And Cultural Values Of Urban And Rural Areas In Qinghai Province	2626
Weining Shi, Zuobin Wu, Yimin Wei & Wendi Dong, Research On The Construction Of The Tang-Tibet Ancient Road (Qinghai Section) Heritage Corridor From The Perspective Of Cultural Ecology	2642
Xiaoyu Shi, Integrating Curation And Retail In Chinese Urban Commercial Revitalization: The Transnational Exchange Of The Curatorial Concept In Shanghai And Beijing, China	2658
Anjali Krishan Sharma, Planning Histories Of Delhi: Urban Governance Perspective . . .	2670
Bilge Nur Bektaş & Serdar M. A. Nizamoğlu, Interpretation And Presentation Strategies For The Heritage Of The Past: The Case Of Smyrna	2690
Jiaying Cui, Weizhen Shen & Qianzheng Geng, Rural Heritage Governed As Commons: A Case Study Of A Chinese Heritage Village From The Cultural Capital Perspective	2722
Cong Li & Kecheng Liu, An Analysis Of Value Reconstruction In Constructive Protection Practice For Archaeological Site Parks	2742
Track 16: Networks And Data	2764
Zehao Song, Jinze Li, Chenyi Cai, Yacheng Song, Yidan Jin & Peng Tang, Digital Modelling And Analysis Of The Network Structure For Residential Historic Areas In China	2766
Yin-Chen Chen, Explore The Improvement Of Humanity-Oriented Transportation Through Adaptive Topology Optimization Of Traffic Networks Using Density Fields	2783
Nataliia Yehorchenkova & Oleksii Yehorchenkov, The Game-Changing Role Of Ai In Urban Development Decision-Making: Trends And Future Perspectives	2791
Haoyang He, Lexun Wang, Jiayu Xu & Yuyang Liu, Citywalk Preference: An Expanded Measurement For Informing Data-Driven Urban Planning Based On Social Media Analytics	2801
Ge Wan & Jianzhong Huang, Spatial Network Characteristics Of Shrinking Areas In Shanghai Metropolitan Area: An Urban-Rural Population Flow Network Analysis .	2821
Fabio Bayro Kaiser, Christa Reicher, Esther Padberg & Sebastian Beisel, Transforming City Regions: Co-Designing Future Planning Education	2842
Burcu Soygüzeloğlu & Fatih Terzi, Insights Into Urban Spatial Dynamics Around Marmaray Stations In Istanbul: Evidence From Social Media Data	2857
Track 17: Risks	2876
Ye Sun & Chen Chen, Resilience Building Of Tourism Villages Confronting Covid-19 In China's Metropolitan Hinterland: Evidence From Shanghai Metropolitan Area . . .	2878
Qianhui He, Shijie Sun & Jinyi Wang, Reflection And Prospects On Data Sources, Management, And Application In Chinese Smart Cities From The Perspective Of Platform Urbanism	2891
Zhuoxu Qi & Jin Duan, Response To Urban Waterlogging Control Under Different Topographic Conditions	2903
Jiang Wang, Inevitability Of Strengthen The Development Of Public Transport In Large Cities From The Perspective Of Security Resilience	2918
Qing Yuan, Jiuqi Meng & Hong Leng, A Study On The Path Of Enhancing The Social-Ecological System Resilience In Shrinking Small Towns In China	2928
Buri Qi, Jiaqi Lin & Lei He, Research On Assessment Model Of Disaster Prevention Capability Of Urban Residential Area	2939

Po-Yu Yang, Identification And Planning Of Potential Ventilation Corridors: A Case Study Of Wuhu, China	2958
Ruben Akse, Simone Ritter, Vincent Marchau & Wijnand Veeneman, Moving Forward In Uncertainty? A Serious Game For Validating Interventions To Manage Uncertainty In Public-Private Collaboration For Sustainable Mobility	2971
Giulia Motta Zanin, Olga Giovanna Paparusso & María Máñez Costa, Managing Coastal Risks In The Mediterranean Through Participatory Processes. Preliminary Insights From The Metropolitan City Of Bari (Southern Italy)	2987
Chih-Po Hsu & Hsueh-Sheng Chang, Flood Risk Management In The Face Of Climate Change: Strategic Spatial Planning For Integrating River Basin Management And Residual Risk	3003
Nataliia Yehorchenkova & Oleksii Yehorchenkov, Urban Resilience In Eu Cities: Insights From Ukrainian Citizens With An Understanding Of War Risks	3012
Aida Arik, David Chionne, Antoine Brochet, Yvan Renou, Juliette Blanchet, Isabelle Ruin & Jean-Dominique Creutin, How Far Do Decision-Makers See? A Spatiotemporal Investigation Of Flood Risk Governance In A French Alps City	3021
Bilge Nur Bektaş, Serdar M. A. Nizamoğlu & Meltem Şenol Balaban, Risk Management For Urban Heritage: The Case Of Izmir	3037
Guevara Viquez Sofia Na, Saturation As Urban Crisis. Understanding Anthropocene From Two Flooded Cities Of The Global South	3078
Maria Moleiro Dale, Ramon Vivanco, Joerg Rainer Noennig & Jan Barski, Bridging The Gap Between Resilience Research And Resilience Planning In Conflict Contexts. Application Of A Federated Urban Resilience Model Toward Rapid Recovery And Sustainable Development.	3093
Matteo D'ambros & Paola Cigalotto, The Necessity Of New Interconnections Of Multiple Ecosystems In The North East Italian Region Between Natural Hazards And A Desired New Ecology	3106
Track 18: Actor Constellations	3123
Shufen Hu, Innovations In Semi-Formal Tools And Multi-Actor Cooperation For Urban Design Governance: The Practice Of City Chief Designer System In China	3124
Lena Verlooy, Tim Devos, Griet Juwet, Lilian Sol Cueva, Martijn Van Den Hurk, Antti Roose & Paulo Silva, Conceptualising The Urban Transformative Capacity Of Underprivileged Neighbourhoods Towards Realising Just Energy Transitions	3136
Special Session	3155
Jiang Wang, Impact Of Tourism Development Process On The Production Space Of Cultural Heritage Sites From The Perspective Of Authenticity	3156
Luca Lazzarini, Maria Chiara Pastore, Israa Mahmoud & Annarita Lapenna, Dis-Integrated Urban Biodiversity: An Analysis Of Urban Policies And Plans In Italy	3163
Nesip Ömer Erem, Özlem Tepeli Türel & Ahmet Türel, Insights Into The Evolution Of Airbnb Accommodations: Beyoğlu Beyond Borders	3173
Constantin Diete, Nguyen Xuan Thinh & Jana Pauline Jegen, Urban Mining Of Mineral Building Materials In The Ruhr Area: A Spatial Analysis	3186
Maria Chiara Pastore Na & Claudia Ida Maria Parenti Na, Urban Forestry Plan: An Overview Through Different Contexts, Governance And Policies	3208
Mauro Baioni, Dispositive-Disposition Dyads As A Lever For Change-Making: The Reconfiguration Of School Spaces Promoted By The Metropolitan Regeneration Program Of Bologna	3222

Stefania Butti, Emanuele Garda, Maria Gattuso, Inaihá Laureano Benincá & Francesca Morganti, Aging In (Urban) Place: A Multidimensional Study To Explore Opportunities For Healthy Longevity In The City	3231
Antonella Marlene Milano, Transhumance Routes As Tourist Destinations: A Concrete Opportunity For Inner Areas Or A Romantic Suggestion?	3240
Giovangiuseppe Vannelli & Sarra Kasri, International, Transdisciplinary And Place-Based Academic Activities: Education, Research And Third Mission. The Experience Carried Out In Sant’eusanio Forconese (L’aquila, Italy)	3265
Enza Lissandrello & Marcus Zepf, Empowerment And Participatory Approaches To Urban Health: The E-City Programme	3278
Online Session	3298
Marichela Sepe, Achieving Proximity In Public Space: Inclusion, Flexibility And Accessibility	3299
Pan Hu, Keyi Sun, Jialu Cheng & Yu Shi, Evaluation And Spatial Governance Strategies For Old Residential Areas’ Renewal And Reconstruction In Urban Downtown Districts: A Case Study Of 70 Old Residential Areas In Changzhou ,China	3315
Hongyu Liu, Women’s Participation In The Context Of Urban Renewal In China: A Case Study Of Yulin Community In Chengdu	3332
Jiayu Xie, Zhiqing Zhao & Meilin Zhu, Temporal Evolution And Conservation Of Urban Morphology In Harbin With Space Syntax	3344
Letizia Chiapperino & Mariella Annesa, Inhabiting The Rural Space. Reflections On The Housing Emergency Of Seasonal Workers In Agriculture	3352
Muntasyir Al Wafi, Ece Kurt & Serengul Secmen, Strategies For Small Public Space To Reclaim Urban Green	3367
Xin Zhao & Zuobin Wu, Social Media Text Mining And Flood Disaster Analysis Of Small Towns In Southern Shaanxi Qinba Mountain Area Based On Deep Learning	3384
Eugenia Vincenti, Mattia Bertin & Javier Ruiz Sanchez, Renewing The City Towards A Linear Attractors Frame. Fuor Cases In Iraq.	3395
Semra Niron & Imge Akcakaya Waite, Actors, Collaboration, And Conflict Dynamics In Local Governments’ Urban Regeneration Incentive Strategies	3410
Kirsten Dormann, Urban Compounding: Housing What Is And What Could Be	3425
Mengying Tang & Zhenyu Li, Research On Urban Sharing Linear Space Design Based On Walking Experience	3440
Deiny Façanha Costa & Paula Freire Santoro, The Conception Of “Axes” In São Paulo, Brasil: A Mixture Of Travelling Of Managers And Ideas, New Urban Plan Methods, In An Incomplete Incorporation Of Transit Oriented Developments (Tod) Agenda	3457
Hazal Ertem, Zeynep Elburz & Koray Velibeyoğlu, Critical Urban Infrastructure Within Concept Of Chrono-Urbanism	3474
Poster	3495
Yuran Zhao, Hong Leng, Yan Zhao & Michele Bonino, Research On Carbon Accounting Methods For Urban Areas Based On Spatial Data Utilization	3496
Wei Wei & Junqiao Li, Investigating The Carbon Elements Based On Remote Sensing, Uav Oblique Photography, And Ai Technologies: A Case Study Of Nanhui New Town, Shanghai	3509
Jonida Meniku, Reflection On The Transformation Of Tirana’s Architectural Spaces	3519

Selin Aslan & Fatih Terzi, Assessing Public Sentiments In Post-Urban Regeneration: A
Location-Based Analysis Of The Karaköy Salıpazarı, İstanbul 3530
Parashqevi Tashi, Ani Tola & Ani Tashi, Tirana’s Housing Units And Parking In 2024 . . 3544

Urban Forestry Plan: an overview through different contexts, governance and policies

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Abstract

Urban forestry plans became an essential integrated tool in urban planning to promote adaptation and mitigation policies and strategies in contemporary cities.

This contribution presents a selection of plans developed in different countries, applying a structured critical interpretation to bring out and compare innovative elements and weaknesses to trigger a challenging comparison between American and European cities. This work frames the Forestami research project within the international urban forestry context to measure its impact and relevance and to address further activities.

The research reveals a heterogeneous approach and results by countries due to different political and cultural contexts to define which are the critical elements that each plan should use to contribute to the sustainable development of the territory.

1. Introduction

Urban forestry concept, developed in the 19th century in America, refers to an integrated, multidisciplinary and 'flexible' (Moeller, 1977) discipline which considers individual green space elements as part of an integral system (Miller, 1997; Konijnendijk & Randrup, 2004) by defining "the design, planning, establishment and management of trees, woodlands and associated flora and open space" (Ball et al., 1999, p. 325) to promote human well-being and urban biodiversity conservation. Urban forestry promotes the implementation of woodland, tree groups, individual trees, and associated open spaces, tending to emphasise the complete role of the forests rather than just their economic provision.

This discipline, widely developed in North America first and then in Europe, refers both to vegetation management within built-up areas both to the one located on the edge of the city (Randrup et al., 2005). Therefore, this different scale-based approach regards the implementation of trees in cities and urban contexts and the management of forests in large national parks and ecological corridors; defining a broad, aware and complete vision that recognises the important role that nature has in the urban territory.

Within the international scene, governance institutions addressed the urban greening topic through several planning and prescriptive levels, deliberating laws and regulations at different government degrees and defining new innovative approaches (Konijnendijk, 2003). The number of plans, laws, and research promoted recently underline a growing interest in sustainable planning and the emergence of urban forests as an integrated tool to contrast climatic transition, better citizens' well-being and health, and promote environmentally fair cities (Nilon et al., 2017, Pierce et al., 2020)

This contribution frames the Forestami research project - which started in 2018 to plant 3 million trees in the Metropolitan Area of Milan - within the international urban forestry context to measure its impact and relevance and to address further activities. It aims to explore urban forestry plans operating in different contexts and environments to define a common ground and develop a critical interpretation for grasping key concepts useful to enrich the possible goals and tools of the Forestami project. Within the broader context of the project research, analysing

effective case studies allows us to measure opportunities and limits of existing plans and provide an overview of actual urban forestry discipline assessment.

The paper analyses seven cases in Europe and the USA, selected among a wide range of international plans. These have been an interesting comparison for achieved results, goals and governance proposals. The inquired cases are Austin, Cleveland, Philadelphia and San Francisco in the US and Barcellona, Birmingham and Manchester in Europe (fig. 1). The comparison was also applied to the Forestami experience. The analysis shows preliminary results, highlighting interesting trends in the discipline.



Fig. 1 Description

2. Recognition of urban forestry tools: methodology and first results.

The research operated through analysing plans and projects developed over time by municipal and metropolitan authorities to study the strategies applied to implement urban forestry as an adaptive and mitigating tool. The first research phase identified 29 plans and projects distributed worldwide (tab.1), operating a screening on several cities, inquiring about the presence of urban forestry plans and projects, including diverse legislative and normative tools that complement urban forestry. The screening, operated in 2022, represents a partial framework of the topic assessment, considering the number of existing plans and language constraints since the research was conducted mainly in English.

We identified three main categories of interest based on chosen key concepts considered relevant for current research trends on urban forestry: (i) green and health, (ii) governance, and (iii) ecosystem services. These key concepts have been used as lenses to read the plans and enhance the main innovative features for urban forestry (tab. 1).

- (i) The **Green and Health** topic embraces the concept of nature as a fundamental element for people's health and well-being. Trees and forests can provide direct and indirect benefits (Mitchell et al, 2007) to the environment by reducing temperatures (Schwaab et al., 2021), reducing pollutant levels (Nowak & Greenfield, 2018), and on people's health by reducing stress and depression (Kondo et al., 2018), improving attention and restoration levels, enhancing social cohesion and promoting physical activities (Lachowycz et al., 2011). Plans that work primarily with this theme are designed to consider citizens' and

socio-health needs, reflecting on the relationship between the urban environment and its effects on human well-being.

- (ii) The **Governance Strategies** topic indicates existing governance approaches and planning mechanisms challenged by multifunctionality across temporal and spatial scales (Asadzadeh et al., 2023).
These strategies describe innovative tools to engage stakeholders at different levels and comprise active discussions and debates with citizens, enhancing critical aspects of forestation, innovative funding methods and engagement of stakeholders, as well as citizens' and companies' involvement in planting and monitoring activities. It also reflects upon the public or private initiative and the opportunity urban forestry could represent for social inclusion, offering job and building a local community network.
- (iii) The **Ecosystem Services** (Pinto et al., 2022) theme identifies plans that focus on increasing public awareness by measuring the economic value of urban nature. By this, with accurate communication and an overall valuation, the strategy is to raise awareness of forestry socio-ecological values and identify the potential of afforestation intervention on the economic public budget.

Plan	Strengths	Period	Normative-Administrative tool
An Urban Forest Master Plan for Birmingham (UK)	Strategy and mapping data	2021-2051	Strategic Plan
London Urban Forest Plan (UK)	Ecosystem services and mapping	2020-2050	Integrated strategic Plan
Manchester City of Trees (UK)	Governance	Since 2015	Integrated strategic Plan
The Urban Green Infrastructure of Vittoria Gasteiz (Spain)	Green and health	Since 2014	Masterplan
Trees for Life, Barcelona (Spain)	Ecosystem services	2017-2037	Integrated strategic Plan
Bosque Metropolitano, Madrid (Spain)	Data mapping	2020-2040	Masterplan
Plan Arbre, Paris (France)	Green and health	2021-2026	Masterplan
Plan Canopee, Liege (Belgium)	Green and health	2020-2030	Participative Tool
City Trees Berlin (Germany)	Green and health	2012-2026	Participative Tool
FUN Porto – Native Urban Forests in Porto (Portugal)	Green and health	2013-2021	Participative Tool
City of Lubjana Urban Forest Strategic Plan	Governance	2020-2045	Strategic Plan
Cleveland Tree Plan (USA)	Green and health	2015-2040	Strategic Plan
Trees Atlanta (USA)	Green and health, mapping	2021-2025	Strategic Plan
Urban Forest Plan Denver (USA)	Governance	2018-2028	Strategic Plan
Halifax tree project (USA)	Green and health, mapping	since 2010	Strategic Plan
Vancouver Urban Forestry Plan (USA)	Green and health	2022-2050	Strategic Plan

Million trees NYC (USA)	Data mapping	Since 2016	Strategic Plan
City Plants, Los Angeles (USA)	Green and health	Since 2001	Strategic Plan
Green Plan Philadelphia (USA)	Green and health	2016-2028	Strategic Plan
Austin's Urban Forest Plan (USA)	Governance	2014-2034	Strategic Plan
Tree Pittsburg (USA)	Governance	since 2012	Strategic Plan
Urban Forest Plan San Francisco (USA)	Governance	2015-2035	Strategic Plan
Corridoras verdes, Medellin (Colombia)	Green and health	2016-2019	Masterplan
Proyecto Montes Verdes, Belo Horizonte (Brasil)	Green and health	Since 2019	Masterplan
Arboles para Lima (Peru)	Green and health		Masterplan
Make a Great City Greener, Melbourne (Australia)	Governance	2012-2032	Masterplan
Urban Forest Strategy, Bayside (Australia)	Governance	2022-2040	Masterplan
Sidney Urban Forestry Plan (Australia)	Governance	2022-2040	Masterplan
One Million Tree Movement (Singapore)	Data mapping	2020-2030	Participative Tool

Table 1. Recognition of plans and projects

The analysis reported the complexity and heterogeneity of implemented approaches from different cities worldwide.

The first consideration resulted in the diversity of normative and legislative tools. We identified different normative and administrative tool: (a) Strategic Plans provide spatial and strategic planning guidelines, (b) Integrated strategic Plans are an integration of an existing broader plans regarding a sustainable vision, (c) Masterplans are projects that provide spatial guidelines to design specific context, (d) Participative Tool concerns plans entailing citizen participation as a critical feature.

Because of this complexity, with the aim to investigate the plan tool as an important device to strengthen urban forestation, we mainly referred to the cases of the (a) Strategic Plan and (b) Integrated Plan, selecting interesting cases to reflect upon the following research themes.

The first research question inquired how cities face urgent and relevant issues related to climate change, investigating the effective interventions and their impacts.

The second reflection was carried out on the different governance processes (public and private) relevant to transferring the goals within public policies. In this field, it results interesting to investigate the differences between bottom-up and top-down approaches, as highlighted by Sanz et al. (2022).

The last investigation regarded the innovative engagement and communication implemented tools, referring to specific contexts and reflecting upon their replicability in other territories.

The research selected 7 main cases to deepen from the USA and Europe. These two contexts provide an interesting comparison due to various historical, environmental, and legislative factors, aiming to highlight common characteristics and strengths of each plan that can constitute the basis for structuring a comprehensive forestation plan. The comparison also

brings attention to the distribution of the Urban Forestry Master Plan planning tool within public planning. In Oceania, it is quite an adopted approach in cities, while in South America, Asia and Africa, there are mostly afforestation projects that, showing anyhow, a great growing interest for the topic.

3. The legislative context of the USA and Europe

Concerning the legislative framework, we found substantial differences between the USA and European approaches to the topic of urban forestry.

The plans selected within the North American context have been mainly conceived by state obligations, defined through established and unified legislation.

The establishment of the first United States Department of Agriculture (USDA) dates back to 1875, leading to the inception of the Forestry Department a year later, aimed at safeguarding the country's existing forests (Johnston, 1996). Simultaneously, the enactment of various acts, including the "Forest and Land Management Act", outlined a program to assess the benefits of urban forests. Another significant initiative was the creation of the 'Tree City USA Grant Program' to develop a comprehensive inventory of vegetation to enhance green spaces within cities. This program, developed by the Arbor Day Foundation, saw participation from 16 states and 42 voluntary communities. Furthermore, in 1990, the National Urban and Community Forestry Council was established to oversee and manage policies and projects related to urban forestation.

The obligation to draw up forestation plans emerged after the 2008 "Farm Bill", an Act for which each Member State was responsible for evaluating the conditions of trees and forests in US territories and consequently developing "Strategic Plans for landscape conservation, forest protection and the increase of public benefits deriving from natural capital". These State Forestry Action Plans, initially developed and completed by all Member States in 2010 (Sambeek, 2017) and updated in 2015, were revised in 2020 by all 59 Member States (USDA, 2021). These plans establish effective worktables and are accompanied by strict economic planning for federal, state, local and private resources to achieve national forest system conservation objectives. In addition to the action plans developed by individual states, the Department of Agriculture provides technical and economic assistance for forestation projects. It draws up monitoring reports on the state of US forests, evaluating and quantifying their ecosystem services.

Currently, the laws issued regarding urban forestation are about 105: in this context, the United States underlines how urban forestation, citizens' health, inclusion, and energy saving are strictly current and interconnected themes, moving towards an interdepartmental and multidisciplinary approach.

On the contrary, Europe has a different normative framework since the European Union does not include all the continent countries (as the UK), and its member states benefit from greater legislative autonomy than US. The Green Deal directive presented in 2019 is undoubtedly incisive, aiming to achieve climate neutrality by 2050 and planting 3 billion trees. Sinergically, with this directive, the promulgation of two plans -the European Strategy for Biodiversity 2030 and the Strategy for Forestry 2030- highlights the importance of forestation in urban environments for the well-being of citizens and the achievement of the objectives of the Green Deal. Moreover, the Nature Restoration Law is currently under approval, with the aim to restore degraded ecosystems in all member states, help achieve the EU's climate and biodiversity objectives and enhance food security. In this regulatory framework, many large European cities are therefore starting to equip themselves with plans to achieve climate neutrality objectives, adopting specific tools for urban forestation, as done by London, Barcelona, Paris and Milan. Despite the context being more uneven and linked to the national regulatory situation, there is

a progressive diffusion of the forestation, suggesting its adoption as a valuable tool for achieving community objectives. Similarly, in the United Kingdom, the 2008 Climate Action Plan was updated in 2019 with the objective of zero net greenhouse gas emissions by 2050. This goal can be achieved by drafting the three-year action plans: the first plan refers to 2021-2024 and pursues the initial goal of creating 30,000 hectares of new forests annually by 2025. In particular, the role of the Forestry Commission Department is essential; it supports forestation policies and projects and the collection of available data, promoting for more than ten years the mapping of ecosystem services given by trees in cities. Moreover, in the United Kingdom, it is possible to observe a tradition linked to the active participation of citizens, who, since the 1990s and 2000s, have formed themselves into organised groups, meeting the interest and involvement of the administrations, as in the cases of Birmingham and Manchester. The first laws and urban forestry plans based on the US model were indeed promulgated in the United Kingdom.

In Italy, there is no defined national legislative panorama on forestation. At a national level, ISPRA (an Institute for Environmental Protection and Research) draws up reports on the State of Natural Capital in Italy. The regions in the Regional Territorial Plans identify the ecological corridors and the elements to be safeguarded, such as regional and national parks. They can determine some guidelines for protecting and safeguarding the existing natural heritage. Municipalities with more than 15,000 inhabitants have the legislative obligation (L. n. 10/2013 and guidelines of the Ministry of the Environment 2017) to draw up the Municipal Green Plans, tools that design the urban, peri-urban, agro-silvicultural structure of the city, providing guidelines for the creation of new green areas within the general urban planning. The green plan configuration differs from a real forestation plan, but it is currently the only defined legislative instrument that can have planning effects.

This tool has not yet become fully operational within urban management and planning activities at a local level. For example, only 11 provincial capitals in northern Italy adopted a green plan (Lazzarini et al., 2024), showing the necessity to improve the planning approach to urban greening.

4. An overview of selected Urban Forestry Plans

The selection of the 7 case studies identified plans presenting both particular elements of innovation in governance and strategy tools, in communication and the active involvement of stakeholders and citizens, and both when covering the role of 'pioneer plans' for specific themes that others have incorporated. For these reasons, the selected plans stand out for the approach used in addressing relevant environmental and social issues, constituting an accurate model that other cities can replicate in their forestation plans.

The proposed approach is a critical analysis conducted using this structure:

- City's state of the art: Why an afforestation plan?;
- Plan's goals and mission;
- Governance;
- Plan structure;
- First feedbacks;
- Additional communication activities and plan promotion tools if present.

The plans strengths are described below and divided based on the key concepts identified.

4.1 Green and health

The *Cleveland Tree Plan*, established in 2013 by the municipality's initiative and created in collaboration with the Cleveland Tree Coalition association, proposes a careful survey of the city's current state. Starting from assuming that trees are the only public infrastructure that increases in value over time (the more the trees grow, the more the benefits provided increase and the greater the impact on the health of the inhabitants), a precise mapping accompanies the Plan, assigning different environmental parameters that positively and negatively influence the health of citizens to each district and neighbourhood.

The plan showed a correlation between tree canopy distribution and citizens' health: in the districts where the loss of tree canopy was more significant it was found a reduction in the inhabitants' health, given the incidence of hospitalisations and the widespread presence of respiratory problems and cardiovascular disease in a variation between 3 and 4% depending on the distribution of the tree canopy. This approach aims to promote a fair distribution of the tree canopy to reduce health disparities.

The city of San Francisco has one of the lowest tree canopies among US cities (13.7%), being located in an arid and not naturally forested area.

The forestry plan, *Urban Forest Plan San Francisco*, adopted in 2015, allows for effective maintenance of trees and identifies new public and private areas to be forested to build a shared public vision for the city's development, involving various local actors and promoters. Three main actions divide the Plan, and their implementation follows different strategies and different time thresholds: rows of trees along the roads, parks and open spaces, and buildings and private properties.

The Plan addresses the relationship between citizens' health and the presence of green areas by implementing and managing trees along the streets. Ensuring shaded paths, safe streets, and a homogeneous distribution of trees throughout the city are the prerequisites for its implementation.

According to a previous analysis made by the municipality, it identifies the most popular routes, the safest ones and those suitable for different types of inhabitants (for example, elderly, disabled, people with strollers, and children), also proposing guidelines to make the street safer and healthier according with the type of traffic. In this sense, the forestation project becomes an urban regeneration tool that provides cultural, social and environmental benefits. The Plan addresses the relationship between citizens' health and the presence of green areas by implementing and managing trees along the streets. Ensuring shaded paths, safe streets, and a homogeneous distribution of trees throughout the city are the prerequisites for implementing the Plan. According to a previous analysis made by the municipality, it identifies the most popular routes, the safest ones and those suitable for different types of inhabitants (for example, elderly, disabled, people with strollers, and children), also proposing guidelines to make the street safer and healthier according with the type of traffic. In this sense, the forestation project becomes an urban regeneration tool that provides cultural, social and environmental benefits.

4.2 Governance

The *Green Plan Philadelphia*, reformulated by the administration in 2020 under the name *Philly Tree Plan*, is a strategic plan that pays attention to social aspects, guaranteeing equity and sustainability objectives that will improve the current state of the city, increasing the trees in the poorest neighbourhoods where most minorities live, also directing investments and development projects.

The Plan's base is the existing survey, which relates the tree canopy distribution to the income levels, the total population, the population affected by respiratory diseases, and exposure to high-temperature levels. For example, the survey records more deaths due to heat stroke in the hottest areas, where the temperature increases by around 6°. Those indicators are a part of the

priority map created in collaboration with the citizen organisation Community Voices Steering Committee. Three levels of priority have been identified: poverty, health problems (such as respiratory diseases and stress disorders) and temperatures. The overlapping of these three issues generated a priority map, allowing the identification of the areas most needing forestation interventions.

Concerning governance, it is significant the inclusion of the association 'Tree Philly' to develop the Action Sheet and strategic guidelines based on different problems identified from a continuous dialogue with citizens and stakeholders. For each problem, the Plan develops an action according to an intervention program and defines further proposals that citizens can remark on.

In Austin, *Austin's Urban Forest Plan* was implemented in 2012 to counteract a prolonged drought that had significantly reduced the presence of trees in the city.

Rather than defining a goal to be reached in a limited time, as other American Cities did, the municipality adopted a broad, long-term vision to establish guidelines for every City Department to manage the urban green infrastructure. The Plan proposes a critical approach, integrating the USDA tree canopy forecast, which requires cities to reach different tree canopy thresholds depending on climate.

The Plan's five goals include implementing a sustainable and resilient forest, improving tree management and care, growing a fund for each Department, protecting and preserving biodiversity and preserving ancient trees. With these defined goals, the municipality developed the 'Austin priority map', which assigns different environmental, social, economic and sanitary parameters for each city's district that, once crossed and overlapped, display the prioritisation of forestry projects according to the different sites.

Birmingham is the second largest English city by population, with over a million trees and large parks; since 2020, it has been among the Tree Cities of the World. However, due to the city's shape, urban greenery is mainly concentrated in peripheral areas, leading to unequal distribution and consequent non-uniform accessibility.

Due to the presence of such a large arboreal heritage and the need for its management, at the beginning of the 2000s, the administration promoted a strategy for the protection and maintenance of trees without allocating funds to implement biodiversity, causing a reaction among citizens. The protest over the lack of a vision for the city's green transformation led to establishing a working group in the City Council to promote the definition of the first "Birmingham Tree Policy" guideline report. The experience of the Council led to the creation of the "Birmingham Tree People" association, which became one of the leading promoters together with the municipality.

This first experience guided the development of the *Urban Forestry Master Plan* in 2021, created in collaboration with the municipality and the Birmingham Tree People association, which defines a vision for the forestry of the city in thirty years, providing a line of action for the first decade 2021-2031. The first part of the Plan defined a prioritised mapping based on the importance of the targets, which became the basis for defining subsequent lines of action. Moreover, the definition of a Tree Board allows coherent management of all the topics analysed. In this way, the administration provides a tool through which citizens can directly report problems relating to the state of trees to promote better heritage management.

In 2017, the tree canopy of Barcellona stood at around 25% and was characterised by an uneven distribution in the urban territory. In early 1995, the municipality promoted various plans for

managing and maintaining city trees, whose aims merged in 2013 into the '2030 Biodiversity Plan', created to increase urban greenery by 1 m² for each inhabitant.

At the same time as the promulgation of constantly updated Biodiversity Plans to achieve the Carbon Neutral objectives for 2050, the municipality, in 2017, promoted the *Trees for Life* Forestry Plan for the thirty years 2017-37, which focuses its action on planning and managing the tree heritage of the city, to complete the 2030 Nature Plan.

The latter promotes a vision for implementing tree capital, divided into ten strategic lines, each including different actions defined in a temporal action program. The Plan also defines different areas of intervention according to the ratio of square meters of tree canopy per inhabitant for each city district. Plantations must be prioritised following equity, strengthening biodiversity, and integrating the metropolitan scale and connections.

An interesting strategy the municipality defines is the "Mans al Verd" program 2020-2023, a plan to promote citizen participation in maintenance and management projects of public green areas. The program presents different projects directly involving residents, inviting citizens to take care of the trees and shrubs by "adopting" them and providing the necessary resources for their care.

4.3 Ecosystem services

The *Manchester City of Trees* Plan was born from the experience that began in the 1990s of the "City of Trees" citizens' movement, which, during its work, found the support of institutions and administrations, promoting since 2019 a strategic plan drawn up following the ecosystem services mapping carried out with the I Tree software.

The Plan is part of a political context in which forestation is strongly encouraged and works on a metropolitan scale. Institutions have already promulgated plans for reducing emissions, the first of which is the Great Manchester Environmental Plan 2019-2024.

After evaluating the benefits reported by the existing assets, the Plan defines a priority mapping that identifies the areas to carry out strategic plantations, aiming to work on the different trees' benefits. Citizen participation in planting interventions is fundamental. City of Trees coordinates their engagement, offering tutorials to teach tree maintenance and organising collective planting events that also systematise the individual initiatives of citizens, who can implement tree capital even in private areas.

5. Critical comparison of plans

The proposed approach used to analyse the plans reveals the different approaches used by cities, allowing the understanding of the context of plan development and within which it operates and interacts with the territory.

This contribution highlights the common use of multidisciplinary tools, which are part of governance strategies and are shared by multiple sectors of the city, allowing the achievement of sustainable objectives by working on the political, economic and social front. All forestation plans work in parallel on several themes. However, the proposed classification (fig.2) highlights only the innovative approaches to compare the investigated plans in an interpretative approach.




		Cleveland Tree Plan	Philly Tree Plan	Austin Urban Forestry Plan	San Francisco Urban Forest Plan	Birmingham Urban Forest Master Plan	Trees for Life Barcelona	All our Trees Manchester	Forestami
Focus	Green and health 								
	Strategy 								
	Ecosystem services 								

Figure 1. Strengths of each examined Plan

In particular, the health topic emerges primarily in the USA, widely treated in different forms, e.g., in Cleveland with a focus on the increase in diseases and the loss of tree canopy, in San Francisco, paying particular attention to the quality of the busiest streets. In Europe, however, since the forestation discipline gained importance in urban planning only in recent years, the plans are more focused on formulating strategies useful for involving various local and institutional actors and evaluating ecosystem services linked to forestry interventions.

In America, therefore, the topic of forestation and well-being has been discussed for almost a decade; the monitoring information for the plans, unlike in Europe, is complete and exhaustive, and the plans themselves, now revised and updated, integrate principles that guarantee social equity, in order to use forestation as a tool of urban, environmental and social regeneration.

The legislative point of view also constitutes one of the main differences. While in the USA, the legislation requires individual states to formulate a forestation plan with the support of the Forestry Department, in Europe, the autonomy of individual states results in legislative fragmentation.

The directives formulated by the main governmental body, the European Union, are perceived as guidelines by individual member states but do not always become part of the legislation, even though many European cities have recently promoted the definition of plans for greenery and biodiversity. Promoting urban biodiversity is then not related only to the urban forestry plan tool, but it is conceived in other planning approaches, such as the Barcelona Nature Plan demonstrates. The United Kingdom, on the other hand, stands out as one of the leaders of forestation in the European context. Therefore, this partial examination returns only to the context of the forestry plan, remembering that, at the same time, other cities are equipping themselves with other tools, such as the Biodiversity Plans.

In the USA plan, the municipality is always involved in the plan formulation, with initiatives that sometimes involve and activate local organisations but are mainly promoted by public bodies. Even in Europe, public bodies support many plans, but looking at some citizens' initiatives necessary to start these processes, as in Birmingham and Manchester, is interesting.

		Cleveland Tree Plan	Philly Tree Plan	Austin Urban Forestry Plan	San Francisco Urban Forest Plan	Birmingham Urban Forest Master Plan	Trees for Life Barcelona	All our Trees Manchester	Forestami
Governance	public								
	private								
	citizens								
Financiers	public								
	private								
Partners	public								
	private								
Engaged subjects	companies								
	citizens								
	third sector								

Figure 2. Engagement and governance levels

From the plans comparison (fig.3), it is, in fact, clear that most of these have a public nature, characterised both by the initiative, often carried out by individual municipalities, and by the participation of financiers and partners. Instead, the Birmingham and Manchester plan stands out for the approach that involves more citizens and private entities, combining the requests of a plan with a bottom-up approach that meets the needs of associations and communities in parallel.

While the governance and financiers are primarily public, the presence of public partners and the involvement of citizens in the plan's activities are a constant for all plans.

This comparison shows that the level of governance employed does not influence the level of engagement: even public plans work in close contact with citizens and local realities (less with the third sector), and even bottom-up plans manage to obtain financiers and partners public.

5.1 Comparison with Forestami project

In Italy, one of the most relevant forestation projects is Forestami, born in 2018 by a research of Polytechnic of Milan, to plant 3 million trees and improve air quality in the metropolitan city of Milan, through constant dialogue between public administrations, universities and bodies operating in the territory, citizens and companies, and the construction of memoranda of understanding that mark the shared commitment to sustainable change in the territory.

In this context, the project is not defined by a legislative obligations, but it is raised by the cooperation of different entities that operate together in the territory to achieve a common objective.

Collective planting activities and cultural dissemination carried out by various training events are a part of the project that also involves schools and citizens and establishes the commitment to participate in the collective change of the territory.

The Forestami project, although not born with a superordinate planning nature, is comparable with the plans described above for these three main reasons: a) the scale, 2) the cultural value, and 3) the governance.

In fact, Forestami includes a broad territorial dimension, not dealing only with a limited area; its spatialisation has characteristics that interact with planning tools. Then it has a collective nature that communicates with the public and private sectors.

And finally, if governance is one of the main strengths, the project has also started reflections on green issues and health and ecosystem services in recent years.

It constitutes an important reference in the Italian context as it holds a public partnership with various bodies, including cultural ones, which operate in the area at all government levels.

6. New perspectives for Urban Forestry plans

As previously mentioned, the elements highlighted in this research can be used in different ways and on different levels to investigate effective tools to improve urban forestry plans in Italy. Public and private governance, citizen engagement, and site-specific objectives adaptable to local, environmental, political and economic contexts are the essential elements that emerged from an analytical synthesis.

Starting from the analysis of the selected plan, the first consideration regards the governance point of view; the public interest in shaping the vision and providing an economic base is crucial for the structure and composition of multidisciplinary teams (Ordóñez et al., 2019).

From an engagement point of view, we underline the interest in the active involvement of citizens through training and participatory events, the sharing of the plan goals with stakeholders and associations, the engagement of local entities that deal with sustainability already present in the territory with the consequent creation of new job opportunities, and the involvement of minorities such as social groups of different cultures and religions. These elements are relevant points involving the constant construction of a dialogue between the administrations and the inhabitants of the cities, which also guarantees the reduction of disparities. However, it is necessary to provide effective tools to measure the impacts of these interventions on the social realm.

Another fundamental aspect resulting from the analysis is the plan's flexibility and its goals, which are closely related to the context's environmental, social, and political conditions, by analysing and reading the state of the art of the city. In this way, considering the challenge of climate change (Gill et al., 2007), it is possible to guarantee a gradual transition in the territory. Then, the constant temperature increasing and the severe droughts that have affected almost all urban contexts led to a significant loss of tree canopy and the reformulation of various plans. In this sense, the proposed objectives cannot only be quantitative but also aim to improve our cities' urban, environmental, and social quality.

Plans can then treat open green spaces and health themes by using the mapping tool, which precisely identifies the spaces that contribute to the psychophysical well-being of people, determining their distribution and accessibility. Verifying the fair distribution of trees in cities is fundamental to guarantee environmental justice, whereby all citizens benefit equally from open spaces by reducing disparities (Wolch et al., 2014, Sharifi et al., 2021). Plans also often use mapping as an interactive and participatory tool in which citizens can acquire an awareness of the environmental quality of the neighbourhood in which they live, which forestation interventions will be carried out and the degree of priority of the interventions.

The lack of defined and complete European and Italian legislation has consequences on planning balances, whereby the most capable territories and cities, with more economic resources and knowledge, spontaneously initiate virtuous forestation plans and projects.

Therefore, it clearly emerges the importance of a public coherent legislation that directs the definition and programming of forestation plans sharing common objectives and concretely contributing to the sustainable development of the territory.

Pending comprehensive and unified legislation on urban forestry, the recommended best practices and highlighted features should aim for urban forestry plans to be recognised and conceived not merely as sectoral plans but as integrated development tools within territorial governance frameworks.

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