TeMA

The 10th volume of the TeMA Journal will promote the debate on the definition and the implementation of methods, tools and best practices aimed at improving energy efficiency at the neighbourhood level while increasing the capacity of urban systems to adapt to natural changes and/or man-made changes.

METHODS, TOOLS AND BEST PRACTICES TO INCREASE THE CAPACITY OF URBAN SYSTEMS TO ADAPT TO NATURAL AND MAN-MADE CHANGES

TeMA

METHODS, TOOLS AND BEST PRACTICES TO INCREASE THE CAPACITY OF URBAN SYSTEMS TO ADAPT TO NATURAL AND MAN-MADE CHANGES

2 (2017)

Cover Image: Tabiat pedestrian bridge in Tehran, Iran by Leila Araghian from Diba Tensile Architecture – Photo by Mohammad Hassan

TeMA. Journal of Land Use, Mobility and Environment offers researches, applications and contributions with a unified approach to planning and mobility and publishes original inter-disciplinary papers on the interaction of transport, land use and environment. Domains include: engineering, planning, modeling, behavior, economics, geography, regional science, sociology, architecture and design, network science and complex systems.

The Italian *National Agency for the Evaluation of Universities and Research Institutes* (ANVUR) classified TeMA as scientific journal in the Area 08. TeMA has also received the *Sparc Europe Seal* for Open Access Journals released by *Scholarly Publishing and Academic Resources Coalition* (SPARC Europe) and the *Directory of Open Access Journals* (DOAJ). TeMA is published under a Creative Commons Attribution 3.0 License and is blind peer reviewed at least by two referees selected among high-profile scientists. TeMA has been published since 2007 and is indexed in the main bibliographical databases and it is present in the catalogues of hundreds of academic and research libraries worldwide.

EDITOR IN-CHIEF

Rocco Papa, University of Naples Federico II, Italy

EDITORIAL ADVISORY BOARD

Mir Ali, University of Illinois, USA
Luca Bertolini, University of Amsterdam, Netherlands
Luuk Boelens, Ghent University, Belgium
Dino Borri, Polytechnic University of Bari, Italy
Enrique Calderon, Polytechnic University of Madrid, Spain
Roberto Camagni, Polytechnic University of Milan, Italy
Derrick De Kerckhove, University of Toronto, Canada
Mark Deakin, Edinburgh Napier University, Scotland
Aharon Kellerman, University of Haifa, Israel
Nicos Komninos, Aristotle University of Thessaloniki, Greece
David Matthew Levinson, University of Minnesota, USA
Paolo Malanima, Magna Græcia University of Catanzaro, Italy
Agostino Nuzzolo, Tor Vergata University of Rome, Italy
Rocco Papa, University of Naples Federico II, Italy
Serge Salat, Urban Morphology and Complex Systems Institute, France
Mattheos Santamouris, National Kapodistrian University of Athens, Greece
Ali Soltani, Shiraz University, Iran

ASSOCIATE EDITORS

Rosaria Battarra, National Research Council Institute of Studies on Mediterranean Societies, Italy
Luigi dell'Olio, University of Cantabria, Spain
Romano Fistola, University of Sannio, Italy
Carmela Gargiulo, University of Naples Federico II, Italy
Thomas Hartmann, Utrecht University, Netherlands
Markus Hesse, University of Luxemburg, Luxemburg
Seda Kundak, Technical University of Istanbul, Turkey
Rosa Anna La Rocca, University of Naples Federico II, Italy
Houshmand Ebrahimpour Masoumi, Technical University of Berlin, Germany
Giuseppe Mazzeo, National Research Council Institute of Studies on Mediterranean Societies, Italy
Nicola Morelli, Aalborg University, Denmark
Enrica Papa, University of Westminster, United Kingdom
Dorina Pojani, University of Queensland, Australia
Floriana Zucaro, University of Naples Federico II, Italy

EDITORIAL STAFF

Gennaro Angiello, PhD student at University of Naples Federico II, Italy
Gerardo Carpentieri, PhD student at University of Naples Federico II, Italy
Stefano Franco, PhD student at Luiss University Rome, Italy
Marco Raimondo, Engineer, University of Sannio, Italy
Laura Russo, PhD student at University of Naples Federico II, Italy
Maria Rosa Tremiterra, PhD student at University of Naples Federico II, Italy
Andrea Tulisi, PhD at Second University of Naples, Italy

TeMA

Journal of
Land Use, Mobility and Environment

METHODS, TOOLS AND BEST PRACTICES TO INCREASE
THE CAPACITY OF URBAN SYSTEMS TO ADAPT TO
NATURAL AND MAN-MADE CHANGES
2 (2017)

Contents

229 REVIEW PAGES
Gennaro Angiello, Gerardo Carpentieri,
Maria Rosa Tremiterra, Laura Russo, Andrea Tulisi

TeMA

REVIEWS PAGES

METHODS, TOOLS AND BEST PRACTICES TO INCREASE THE
CAPACITY OF URBAN SYSTEMS TO ADAPT TO
NATURAL AND MAN-MADE CHANGES 2(2017)

Starting from the relationship between urban planning and mobility management, TeMA has gradually expanded the view of the covered topics, always remaining in the groove of rigorous scientific in-depth analysis. During the last two years a particular attention has been paid on the Smart Cities theme and on the different meanings that come with it. The last section of the journal is formed by the Review Pages. They have different aims: to inform on the problems, trends and evolutionary processes; to investigate on the paths by highlighting the advanced relationships among apparently distant disciplinary fields; to explore the interaction's areas, experiences and potential applications; to underline interactions, disciplinary developments but also, if present, defeats and setbacks.

Inside the journal the Review Pages have the task of stimulating as much as possible the circulation of ideas and the discovery of new points of view. For this reason the section is founded on a series of basic's references, required for the identification of new and more advanced interactions. These references are the research, the planning acts, the actions and the applications, analysed and investigated both for their ability to give a systematic response to questions concerning the urban and territorial planning, and for their attention to aspects such as the environmental sustainability and the innovation in the practices. For this purpose the Review Pages are formed by five sections (Web Resources; Books; Laws; Urban Practices; News and Events), each of which examines a specific aspect of the broader information storage of interest for TeMA.

01_WEB RESOURCES
The web report offers the readers web pages which are directly connected with the issue theme.

author: Maria Rosa Tremiterra
Tema Lab - Università Federico II di Napoli, Italy
e-mail: mariarosa.tremiterra@unina.it

02_BOOKS
The books review suggests brand new publications related with the theme of the journal number.

author: Gerardo Carpentieri
Tema Lab - Università Federico II di Napoli, Italy
e-mail: gerardo.carpentieri@unina.it

03_LAWS
The law section proposes a critical synthesis of the normative aspect of the issue theme.

author: Laura Russo
Tema Lab - Università Federico II di Napoli, Italy
e-mail: laura.russo@unina.it

04_URBAN PRACTICES
Urban practices describes the most innovative application in practice of the journal theme.

author: Gennaro Angiello
Tema Lab - Università Federico II di Napoli, Italy
e-mail: gennaro.angiello@unina.it

05_NEWS AND EVENTS
News and events section keeps the readers up-to-date on congresses, events and exhibition related to the journal theme.

author: Andrea Tulisi
Tema Lab - Università Federico II di Napoli, Italy
e-mail: andrea.tulisi@unina.it

TeMA

评述页：

提高城市系统对自然及人为变化顺应能力的方法、工具和最佳实践

TeMA 从城市规划和流动性管理之间的关系入手，将涉及的论题逐步展，并始终保持科学严谨的态度进行深入分析。在过去两年中，智能城市（Smart Cities）课题和随之而来的不同含义一直受到特别关注。

学报的最后部分是评述页（Review Pages）。这些评述页具有不同的目的：表明问题、趋势和演进过程；通过突出貌似不相关的学科领域之间的深度关系对途径进行调查；探索交互作用的领域、经验和潜在应用；强调交互作用、学科发展、同时还包括失败和挫折（如果存在的话）。

评述页在学报中的任务是，尽可能地促进观点的不断传播并激发新视角。因此，该部分主要是一些基本参考文献，这些是鉴别新的和更加深入的交互作用所必需的。这些参考文献包括研究、规划法规、行动和应用，它们均已经过分析和探讨，能够对与城市和国土规划有关的问题作出有系统的响应，同时还对诸如环境可持续性和在实践中创新等方面有所注重。因，评述页由五个部分组成（网络资源、书籍、法律、城市实务、新闻和事件），每个部分负责核查 TeMA 所关心的海量信息存储的一个具体方面。

01_WEB RESOURCES

网站报告为读者提供与主题直接相关的网页。

author: Maria Rosa Tremiterra
那不勒斯菲里德里克第二大学民用建筑与环境工程系 TeMA 实验室 e-mail: mariarosa.tremiterra@unina.it

02_BOOKS

书评推荐与期刊该期主题相关的最新出版著作。

author: Gerardo Carpentieri
那不勒斯菲里德里克第二大学民用建筑与环境工程系 TeMA 实验室 e-mail: gerardo.carpentieri@unina.it

03_LAWS

法律部分提供主题相关标准方面的大量综述。

author: Laura Russo
那不勒斯菲里德里克第二大学民用建筑与环境工程系 TeMA 实验室 e-mail: laura.russo@unina.it

04_URBAN PRACTICES

城市的实践描述了期刊主题在实践中最具创新性的应用。

author: Gennaro Angiello
那不勒斯菲里德里克第二大学民用建筑与环境工程系 TeMA 实验室 e-mail: gennaro.angiello@unina.it

05_NEWS AND EVENTS

新闻与活动部分让读者了解与期刊主题相关的会议、活动及展览。

author: Andrea Tulisi
那不勒斯菲里德里克第二大学民用建筑与环境工程系 TeMA 实验室 e-mail: andrea.tulisi@unina.it

01

METHODS, TOOLS AND BEST PRACTICES TO INCREASE THE CAPACITY OF URBAN
SYSTEMS TO ADAPT TO NATURAL AND MAN-MADE CHANGES 2(2017)

REVIEW PAGES: WEB RESOURCES

MARIA ROSA TREMITERRA
TeMALab – Università Federico II di Napoli, Italy
e-mail: mariarosa.tremiterra@unina.it

In this number
TOOLKITS FOR URBAN ADAPTATION PLANNING

Urban areas are particularly vulnerable to impacts of climate change (IPCC, 2014). Even if many efforts have been done to reduce GHG emissions, considered as one of the main reasons of climate change, their effects will be betrayed for decades to come. In the last twenty years there was an increasing awareness on climate change mitigation, while only in the last few years policy makers have implemented adaptation strategies and actions at local level (De Gregorio Hurtado et al, 2015). As opposed to mitigation strategies, based on consolidated approaches and tools (i.e. SEAP by Covenant of Mayors), the urban adaptation to climate change is interpreted in different ways from city to city. Adaptation, indeed, depends both from climate risks and resilience features of the urban community (Pinto, 2014).

In this context, researchers have started to define cognitive frameworks to help policy makers in order to develop adaptation plans and better manage adaptation processes. In particular, as regards adaptation plans, they are characterized by two elements:

- the definition of future climate scenarios;
- the definition of adaptation measures.

While climate scenarios are based on available data and are uncertain in many cases, proposed adaptation measures are synergist with policy decisions and are referred not only to technical aspects, but also urban planning, contingency planning, etc. (Johnson and Brail, 2012).

In this number, three websites are presented. They illustrate some web platforms that local authorities, urban planners and other professionals can consult in order to define strategies and actions of urban adaptation associated with climate change. Those platforms include a toolset for adaptation planning.

The first one is the Climate-ADAPT, a platform developed by European Commission for supporting EU adaptation policy and decision making both at national and local level to implement adaptation policies and strategies. The second platform is U.S. Climate Resilience Toolkit born by a partnership of agencies and organizations for implementing urban resilience in U.S. federal governments. Finally, the third website is developed by Medellin Collaboration on Urban Resilience (MCUR) at international level in order to collect different kind of tools that local authorities can use to develop their adaptation plans.

CLIMATE-ADAPT – EUROPEAN CLIMATE ADAPTATION PLATFORM
http://climate-adapt.eea.europa.eu/

Climate-ADAPT – European Climate Adaptation Platform is a website developed by the European Commission (DG CLIMA, DG Joint Research Centre and other DGs) and European Environment Agency. It supports the EU nations to develop and implement policies, strategies and actions in adapting to climate change. It contains several information and data related to:

− future European climate change scenarios;

− vulnerabilities of EU regions and adaptation sectors;

− adaptation case studies;

− tools to support adaptation planning.

The platform is organized in seven sections: *About*, *Database*, *EU policy*, *Countries, regions, cities*, *Knowledge*, *Network*, *Help.* The *About* section introduces the website and contains general information about its organization, as well as web links to the Climate-ADAPT partners. The *EU policy* section collects all the EU policies referred to adaptation to climate change. In detail, the section is composed by five pages about EU Adaptation Strategy, EU mainstreaming in sector policies, EU funding of adaptation and Mayors-Adapt initiative. In *Countries, regions and cities*, organized in four subsections, there is an overview about information on strategies and actions related to adaptation, developed or under development, in the EU transnational Regions, in the EU States and, finally, in some European cities, which represent the cores of the adaptation challenges. The *Knowledge* section includes adaptation information and a variety of tools and methods to support adaptation policy and decision-making by European stakeholders. It is divided into three sub-sections. While the first one describes the section's contents, the *Adaptation information* includes information on: future climate scenarios; vulnerability assessments for EU region or sector; potential adaptation options considering specific climate impact and/or adaptation sector; the adaptation strategies of EEA Member countries; the research projects on climate change adaptation performed on European transnational and national level. The last sub-section, *Tools*, contains seven specific tools: the *Adaptation Support Tool*, which assists users involved in development of climate change adaptation policies; the *Case Study Search Tool*, which allows to find case studies in Europe for different locations as well as for various impacts and sectors; the *Uncertainty guidance*, which provides guidance on handling uncertainty in the process of decision making on adaptation; the *Climate-ADAPT Map Viewer*, which provides observations and projections of climate change impacts, vulnerability and risks; the *Urban Adaptation Support Tool*, which supports adaptation practitioners in cities and towns; the *Urban Vulnerability Map Book*, which provides maps on potential impacts of climate change, vulnerabilities and adaptation actions of European cities; the *Guidelines for project managers*, which provides guidance on making investment projects resilient to climate variability and change. Furthermore, there is an additional page that collects supplementary tools. The *Network* section provides an overview of the main networks that are active on climate policies, and of the most important knowledge sharing platforms. In the *Help* section a wide variety of materials are collected. Its purpose is set up for new users to offer guidance through the platform. In particular, the section provides a *Glossary* with relevant terms related to climate change adaptation, *Tutorial Videos* dedicated to specific user needs. Moreover, there are *FAQ for Users* and a *Guidance to search function* for using the platform and a *Share your information* page that show how to submit content to Climate-ADAPT. The Database section allows to search and select all the information of the platform both for Keyowrds and specific selection criteria (Type of Data, Adaptation sectors, Climate Impacts, Adaptation Elements, Countries and Year).

U.S. CLIMATE RESILIENCE TOOLKIT
https://toolkit.climate.gov/

U.S. Climate Resilience Toolkit is a website which collects and provides useful tools, information and also subject matter expertise about climate resilience. In particular, the Toolkit is intended for the U.S. federal governments. It aims "*to improve people's ability to understand and manage the risks and opportunities arising from climate change beyond and to help communities and businesses to be more Resilient in case of extreme climatic events*". The platform was developed by a partnership of federal agencies and organizations led by the NOAA (National Oceanic and Atmospheric Administration) within the U.S. Department of Commerce and launched in 2014. Specifically, a user can access the platform information in different ways. The *Home Page* collects general information about the Toolkit and its features and how to explore them.

The Toolkit content is grouped into six sections:

— *Steps to Resilience*, which illustrates a framework, organized into five steps – Explore Hazards, *Assess Vulnerability & Risks*, *Investigate Options*, *Prioritize & Plan* and *Take Action* - in order to discover climate hazard and develop solutions to lower climate risks;

— *Case Studies*, where several case studies of actions implemented in the U.S. to reduce vulnerabilities and build resilience to climate impacts are collected. Users can filter case studies considering four criteria which are threat/stressor (i.e. sea level rise, temperature extremes), topic (i.e. coast, built environment), resilience (i.e. explore hazards, assess vulnerability & risks) and U.S. region;

— Each case study provides a description and the references to the corresponding step to resilience framework and also to the related tools;

— *Tools*, which collects more than 200 digital tools that can support local authorities to take steps to build resilience. The section permits to select tools considering two criteria, topic (the same ones of Case Studies) and tool function (i.e. identify vulnerabilities, view past/current conditions);

— For each tool there is a description about its main features and additional information (Webpage, Documentation, Training/Tutorials and Partners);

— *Expertise*, organized into three sub-sections, *Find Experts*, *Reports* and *Training Courses*. In the *Find Experts* sub-section regional and local centres across the U.S. that are useful to build resilience are collected. Through the *Reports* sub-section it is possible to access climate-relevant reports issued by government agencies and scientific organizations;

— Finally, the *Training Courses* collect several free courses, selected by category (i.e. Climate Change, Climate Adaptation & Mitigation), type of training (i.e. Tool Tutorial) and difficulty scale (i.e. Beginner, Intermediate, Advanced), that can help users acquire tools, skills and knowledge useful to manage climate risks and opportunities;

— *Regions,* which reports three U.S. regions, Alaska and the Artic, Hawa'i and Pacific Islands and Northeast. For each region there is a description of the main climate issues. Moreover, all the Toolkit information are referred to these three regions;

— *Topics,* where are identified ten main topics/sectors related to climate change, Built Environment, Coasts, Ecosystems, Energy, Food, Health, Marine, Transportation, Tribal Nations and Water. For each topic there is a synthetic description of the potential climate change impacts on it. Furthermore, as well as for *Regions* section, the information collected by the Toolkit can be referred to these ten topics.

RESILIENCETOOLS.ORG – EMPOWERING RESILIENT CITIES
http://resiliencetools.org/

ResilienceTools.org is a web platform launched during the World Urban Forum held in Medellin in 2014 and was developed by Medellin Collaboration on Urban Resilience (MCUR), which includes among its member organizations such as C40 Cities Climate Leadership Group; Cities Alliance; Global Facility Disaster Reduction and Recovery (GFDRR); ICLEI-Local Governments for Sustainability; Inter-American Development Bank; UN-Habitat; UN Office for Disaster Risk Reduction (UNISDR); Rockefeller Foundation; 100 Resilient Cities-Pioneered; World Bank Group.

The aim of such website is to provide local governments with the necessary and useful skills to use tools that can assess, measure, monitor and improve the resilience of cities. In this regard, the platform collects tools of a different type, in order to allow local decision makers to choose the one most suited to meet their needs.

It is organised into five sections:

— *Home*, which provides an overview of the main site content;

— *About us*, where are illustrated the main objectives of the platform, its history and with a *Contact* subsection;

— *Tools*, which includes useful information and it is articulated in two sub-sections, *Case Studies* and *Tools Overview*. In the *Case Studies* sub-section there is a review of case studies. Instead, the *Tools* sub-section collect numerous decision-making tools in order to improve urban resilience;

— *Terminology*, where are collected the most important terms related to the theme of urban resilience;

— *Partners*, which collects all the partner organisations involved in the definition of the platform;

— *Resources*, which includes audio-visual material, technical reports and information related to the activities related to urban resilience, organized into three sub-sections *News*, *Pocket Guide to Resilience* and *Publications*.

REFERENCES

De Gregorio Hurtado, S., Olazabal, M., Salvia, M., Pietrapertosa, F., Olazabal, E., Geneletti, D., D'Alonzo, V., Di Leo, S., & Reckien, D. (2015). Understanding How and Why Cities Engage with Climate Policy: An Analysis of Local Climate Action in Spain and Italy.. *Tema. Journal of Land Use, Mobility and Environment*, *8* (Special Issue ECCA 2015), 23-46. doi:http://dx.doi.org/10.6092/1970-9870/3649.

IPCC (2014). Climate Change 2014: Impacts, Adaptation, and Vulnerbility. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA.

Johnson, K., & Breil, M. (2012). Conceptualizing urban adaptation to climate change-findings from an applied adaptation assessment framework. Available at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2077476.

Pinto, F. (2014). Urban Planning and Climate Change: Adaptation and Mitigation Strategies. *Tema. Journal of Land Use, Mobility and Environment*, *7* (Special Issue INPUT 2014). doi:http://dx.doi.org/10.6092/1970-9870/2547.

IMAGE SOURCES

The images are from: https://it.pinterest.com/johorrocksnz/communitycity-resilience/?lp=true; http://climate-adapt.eea.europa.eu/; https://toolkit.climate.gov/; http://resiliencetools.org/.

02

REVIEW PAGES: BOOKS

GERARDO CARPENTIERI
TeMALab – Università degli Studi di Napoli Federico II, Italy
e-mail: gerardo.carpentieri@unina.it

In this number
CLIMATE CHANGE AND URBAN PERSPECTIVES

The international scientific community, aware of the extreme gravity of the "congestion crisis" that characterizes large cities and metropolitan cities in particular, is increasingly committed to developing methodologies, models and techniques that can reverse trends, especially for environmental sustainability. With 1.5 million people moving into cities every week, managing urban growth is one of the most important development challenges facing the world today.

Furthermore, the global greenhouse gas emissions continue to rise and have been shown to lead to a range of major and potentially adverse effects on the environment and public welfare.

This is two topics to the process of urbanization and all human, social and behavioural activities related to it, which have intensified environmental problems (Salata and Yiannakou, 2016).

The climate change impacts are diverse, long-term, and not easy to predict. Adapting to climate change is difficult because it requires making context-specific and forward-looking decisions regarding a variety of climate change impacts and vulnerabilities when the future is highly uncertain. Cities are on the front line for responding to potential climate change impacts, but often do not know precisely the qualities or characteristics that make them vulnerable or resilient to different impacts.

A conceptual framework was developed based on our definition of urban climate resilience: a city's ability to reduce exposure and sensitivity to, and recover and learn from gradual climatic changes or extreme climate events. This ability comes from a city's risk reduction and response capacity, and includes retaining or improving physical, social, institutional, environmental, and governance structures within a city. The components of urban climate resilience reflected in the conceptual framework include three measures of vulnerability (exposure, sensitivity, and response capacity), as well as the process of initiating responsive action, learning from mistakes or ineffective responses, and building risk reduction capacity (reducing exposure and sensitivity, and increasing response capacity).

According to these themes, this section suggests three books and reports that help to better understand the issue of this number: Evaluating Urban Resilience to Climate Change: A Multi-Sector Approach, Urban Perspectives: Climate Change, Migration, Planning and Finance - A New Generation of Ideas and Integrating Land Use, Transport and Energy Planning.
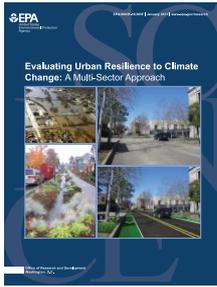
Title: **Evaluating Urban Resilience to Climate Change: A Multi-Sector Approach**
Author/editor: United States Environmental Protection Agency
Publisher: Office of Research and Development
Publication year: 2017
ISBN code: -

This report was realized by the U.S. Environmental Protection Agency's Air, Climate, and Energy research program, located within the Office of Research and Development, with support from the Cadmus Group.

One of the objectives of this office within the U.S. Environmental Protection Agency is to provide the scientific basis for climate adaptation choices that support sustainable, resilient solutions at individual, community, regional, and national scales. To support this objective, the Office developed a tool that measures urban communities' resilience to climate change. The tool incorporates both indicator data and input from local sector managers to assess urban resilience for eight municipal management sectors: water, energy, transportation, people (public health and emergency response), economy, land use/land cover, the natural environment, and telecommunications. The tool is intended to provide local-level managers with a way to prioritize threats to resilience using locally available data across multiple sectors to inform adaptation planning. This report describes the tool in detail and discusses the results of applying it in two communities as case study examples: Washington, DC and Worcester, MA. These two cities representing different endpoints of a broad spectrum of resources, planning, and risk. The Technical Steering Committee developed a four-step process to establish qualitative indicators best suited to determine climate resilience. In the step one, it was identifying climatic changes/events of concern. In the step two, it was discussing related climate stressors. In the step three, it was discussing urban services potentially exposed to drought and urban sectors potentially responsible for managing the sensitivities of these services. In the step four, it was evaluating the ability to reduce exposure/sensitivity, enhance response capacity, and learn. To organize and obtain detailed data sets relevant to urban resilience, the project team created a database of more than 1,400 quantitative and qualitative indicators or metrics derived from the literature on climate change and urban resilience.

The application of the qualitative indicators fosters and requires interaction with and between sector stakeholders, providing greater learning and coordination opportunities that can be used to further refine the resilience assessments and prioritize activities in response to the assessment findings.

For each of the quantitative indicators, threshold values were established defining the upper and lower boundaries of the four resilience categories. Initial thresholds were established through a review of published academic literature, panel data, case studies, and other reports. Thresholds for the quantitative indicators were based on the literature when possible, accounting for the full range of values the indicator takes on in cities across the United States. Beyond the numeric values of resilience and importance collected across the sectors during the case studies, this effort collected important information regarding the challenges that emerged in identifying and confirming appropriate and relevant data sources to effectively assess the proposed indicators.

A major challenge encountered in applying the tool was gathering city-specific knowledge. Different methods were attempted in the two case studies in this report: a workshop approach in Washington, DC and one-on-one discussions in Worcester, MA.

This project resulted in a comprehensive, transparent, and flexible tool for identifying the greatest risks, successes, and priorities for decreasing urban vulnerability and increasing resilience to climate change. The results can easily be analysed with respect to the concepts of exposure/sensitivity, response capacity, or learning, as the qualitative and quantitative indicators are characterized accordingly.
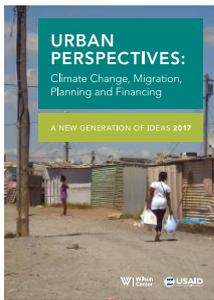
Title: **Urban Perspectives: Climate Change, Migration, Planning and Finance - A New Generation of Ideas**
Author/editor: Woodrow Wilson International Center for Scholars, US Agency for International Development
Publisher: Urban Sustainability Laboratory
Publication year: 2017
ISBN code: 978-1-938027-66-6

This publication marks the seventh year of the "Reducing Urban Poverty" paper competition and includes a range of perspectives on urban challenges and policy solutions. To select the winning papers for this publication, a panel of urban experts representing each of the sponsoring institutions reviewed 157 abstract submissions, from which twenty-seven student authors were invited to write a full-length paper. Of these, eight papers were selected to be included in this publication. The chapters in this volume critically examine urban policies and projects, offering original, solutions-oriented research and strategies. In particular, the contributes are divided by four main research themes are listed below:

— *Arrival Cities: Responding to Migrants and Refugees;*

— *Climate Change;*

— *Innovation in Urban Planning;*

— *Financing Sustainable Urban Development.*

For the first theme, it was examining the incremental housing model of the Urban Shelter Program of the Norwegian Refugee Council. The program provides financial assistance for house expansions and interior finishings to homeowners in cities of Northern Jordan in exchange for rent-free accommodation to Syrian refugee families. Authors Francis Goyes, Sera Tolgay and Valeria Vidal combine quantitative and qualitative analysis to explore the benefits of the project, making the case for incremental housing as a shelter strategy for refugees in urban settings.

For the second theme, Kwame Owusu-Daaku and Stephen Kofi Diko analyse the sea defence project in the Ada East District of Ghana, analyse differences in national, district and community level discourse on climate change adaptation, exploring the implications for policy formulation and implementation. The authors put forth a set of recommendations for improved stakeholder engagement for effective urban climate change adaptation. The second contribute wrote by Lakshmi Rajagopalan on the case study of Chennai, India to emphasize the need to integrate climate resilience into urban planning and development policies. Rajagopalan examines key factors that cause flooding, concluding with policy recommendations for increased coordination and integration of strategies and implementation frameworks for land use development and urban food control.

For the third theme, Jakub Galuszka draws from research conducted in the Philippines and South Africa to analyse the role of evidence-based planning and evaluation regimes in housing policies. The second author, Emily Hall investigates how urban morphological analysis can be used as a tool to assess and develop policy responses to multiple deprivations in data poor cities of the developing world.

For the last theme, Devaditya Mukherjee draws from fieldwork conducted in Bhilai Township to examine strategies to leverage public land for public housing development in India. Yuxiang Luo examines the intricacies of public-private partnership for urban redevelopment in a case study of Dachong Village Redevelopment in Shenzhen, China. Nicolás Valenzuela-Levi examines the impact of social housing policies in Chile on the creation of jobs and access to opportunities.
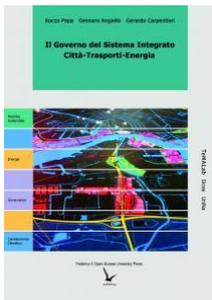
Title: **Integrating Land Use, Transport and Energy Planning**
Author/editor: Rocco Papa, Gennaro Angiello, Gerardo Carpentieri
Publisher: FedOApress
Publication year: 2017
ISBN code: 978-88-6887-013-3

This book has been published on the open access platform FedOABooks of the University of Napoli Federico II, in the series Smart City, Urban Planning for a Sustainable Future.

The objective of the book is to identify the characteristics of the transport offer on which to adapt the modes and means of transport, in relation to the physical and functional components of the urban system.

The first chapter, "Urban System, Energy Consumption and Sustainable Mobility", proposed a scientific analysis on the extreme gravity of the "congestion crisis" that characterizes large cities and metropolitan cities in particular is increasingly committed to developing methodologies, models and techniques that can reverse trends in the pipeline, especially for environmental sustainability.

In the chapter, "Energy Consumption in the Urban Transport: Variables, Techniques and Models", it is drowned a cognitive framework is proposed for the complex relationship between mobility, energy consumption and the environment built also through a review of the latest scientific literature. In particular, the two main sources of energy consumption in urban areas (energy consumption in the residential sector and energy consumption of transport) are considered, which are the most important sectors in Italy, accounting for 32% and 35% respectively of end-use energy consumption. The chapter, "Energy Consumption in the Urban Settlements with an Application to the City of Naples", it is focused on the development of a technique for the representation and classification of energy consumption of urban settlements with a case study application to the city of Naples. It placed particular emphasis on the new opportunities offered by the Geographic Information Systems (GIS) and the growing availability of new data sources.

In the last chapter, "Instruments, Actions and Best Practices for Reducing Energy Consumption in Urban Mobility", the authors proposed an analysis of tools, actions and best practices for reducing energy consumption is proposed. In particular, the urban mobility instruments are presented, describing, for each of them, the main objectives, contents and modalities of implementation. In particular, the urban mobility instruments are presented, describing, for each of them, the main objectives, contents and modalities of implementation.

REFERENCES

Papa, R., Angiello, A., Carpentieri G., (2016). Integrating Land Use, Transport and Energy Planning. Fedoa Press. doi: http://10.6093/978-88-6887-013-3. Available at http://www.fedoabooks.unina.it/index.php/fedoapress/catalog/book/53

U.S. EPA. Evaluating Urban Resilience to Climate Change: A Multi-Sector Approach (Final Report). U.S. Environmental Protection Agency, Washington, D.C., EPA/600/R-16/365F, 2017.

UN (United Nations). (2014). World Urbanization Prospects: The 2014 Revision. United Nations, New York. ST/ESA/SER.A/366. Available at http://esa.un.org/unpd/wup/Publications/Files/WUP2014- Report.pdf.

Salata, K., & Yiannakou, A. (2016). Green Infrastructure and climate change adaptation. *Tema. Journal of Land Use, Mobility and Environment, 9*(1), 7-24. doi:http://dx.doi.org/10.6092/1970-9870/3723.

03

REVIEW PAGES: LAWS

LAURA RUSSO

TeMALab - Università degli Studi di Napoli Federico II, Italy

e-mail: laura.russo@unina.it

URBAN PLANNING AND GOVERNANCE IN EUROPE

Spatial planning affects a wide range of outcomes, from citizens' quality of life to the environmental sustainability of urban and rural areas, including the possibilities for climate change adaptation and mitigation. Not to mention the economic impacts of spatial planning and its consequences in terms of social inclusion. Therefore, planning policy is extremely important for both the economic growth and social development of territories. However, major reforms that completely change the character of the planning system are quite rare in European countries. Only few States have updated their planning legislation to better face the challenges of globalization and climate change.

Based on these considerations, in the previous issue of TeMa, this section of the Review Pages described and compared the organization of spatial and land-use planning in three European countries – Italy, France and Germany – that have recently modernized their government structure and their spatial organization in order to promote growth and innovation. In line with this topic, this issue of the Journal focuses on two other European countries – England and the Netherlands – where a major legislative reform has taken place in recent years. More specifically, England adopted the *National Planning Policy Framework* in 2012 and the Dutch parliament adopted the *Environment and Planning Act* in 2016. Both documents have the objective to consolidate all the previous national legislation under one simpler framework, thus allowing people and communities back into planning. Another point of convergence between the two planning laws is the key role played by sustainable development. In both cases, indeed, sustainability is crucial and also a binding element, as stated at the beginning of the *National Planning Policy Framework – "The purpose of the planning system is to contribute to the achievement of sustainable development"* (art. 6) – and at the beginning of the *Environment and Planning Act – "With a view to ensuring sustainable development, the habitability of the country and the protection and improvement of the living environment, this Act aims to achieve the following interrelated objectives: a. to achieve and maintain a safe and healthy physical environment and good environmental quality, and b. to effectively manage, use and develop the physical environment in order to perform societal needs"* (art. 1.3). This approach is in line with the recent recommendations of the European Commission, which has pointed out the importance of integrating environmental policy with other actions and updating tools and operational instruments for a more sustainable and inclusive urban planning (Papa et al., 2014). In the following pages, the two legislative documents are synthetically described in order to highlight the main innovations and present the key planning instruments introduced by the two Acts.

NATIONAL PLANNING IN ENGLAND – THE NATIONAL PLANNING POLICY FRAMEWORK

In England, the *National Planning Policy Framework* (NPPF) sets out how government policies should be applied and must be taken into account by local policy makers in the preparation of their own local and neighbourhood plans. The NPPF was published in 2012 and it replaced all *Planning Policy Statements* (PPS) and *Planning Policy Guidance Notes* (PPG) previously produced by the British Government.

"At the heart of the National Planning Policy Framework is a presumption in favour of sustainable development, which should be seen as a golden thread running through both plan-making and decision-making" (National Planning Policy Framework of 2012). Therefore, the main purpose of the NPPF is to support the achievement of the Brundtland principles of sustainable development, pursuing economic, social and environmental goals in an integrated way. In order to achieve this aim, the NPPF identifies 13 lines of actions that should be taken into account when delivering sustainable development:

− building a strong, competitive economy;

− ensuring the vitality of town centres;

− supporting a prosperous rural economy;

− promoting sustainable transport;

− supporting high quality communications infrastructure;

− delivering a wide choice of high quality homes;

− requiring good design;

− promoting healthy communities;

− protecting Green Belt land;

− meeting the challenge of climate change, flooding and coastal change;

− conserving and enhancing the natural environment;

− conserving and enhancing the historic environment;

− facilitating the sustainable use of minerals.

The Framework envisages that the starting point for any planning decision is the Local Plan and *"each local planning authority should produce a Local Plan for its area"* (National Planning Policy Framework of 2012). Local Plans should refer to a preferably 15-year time frame and should be based on a clear understanding of the main economic, social and environmental trends of the area. Moreover, Local Plans should be prepared based on *strategic priorities* set out to provide homes, jobs, infrastructures, and ensure health, public safety and environmental resilience. This strategic framework should be taken into consideration when preparing the Neighborhood Plan, which must be consistent with it. Neighborhood Plans gives communities direct power to develop a shared vision for their neighborhood and shape the development and growth of their local area.

When the final version of the Framework was released, the reaction of both public and private stakeholders was relatively positive, because the document extremely simplified planning process. However, in 2016, the Communities & Local Government (CLG) Committee asked for a comprehensive review of the NPPF in order to ensure that "*the Government, stakeholders in the housing and planning sectors, and local communities are able to have confidence in the effective operation of the NPPF*" (Consultation on proposed changes to national planning policy of 2015). In particular, the CLG Committee highlighted that, four years on from the publication of the NPPF, 34% of local authorities still have not adopted Local Plans.

URBAN PLANNING & GOVERNANCE IN FRANCE

On March 2016, the Dutch parliament adopted the Environmental Planning Act (EPA) and the Act is expected to take effect in 2019. *"The Act seeks to modernise, harmonise and simplify current rules on land use planning, environmental protection, nature conservation, construction of buildings, protection of cultural heritage, water management, urban and rural redevelopment, development of major public and private works and mining and earth removal and integrate these rules into one legal framework"* (Environment and Planning Act (Omgevingswet) of 2016). This document marks an important shift from the old environmental law dispersed across 26 different acts into one consolidated piece of legislation.

The legislative bill provides a uniform range of instruments with which to manage activities properly. These instruments reflect the national planning system that includes three levels of government – the national level, the provincial level and the municipal level – and other important public actors, such as 23 water boards. More specifically, the Act introduces three decentralized regulations

− The physical environment plan: *"The municipal council shall adopt a single environmental plan in which rules on the physical living environment will be included"* (Environment and Planning Act of 2016, art. 2.4).

− The water board regulation: *"The governing board of the water board shall lay down a single water board regulation containing rules relating to the physical environment"* (Environment and Planning Act of 2016, art.2.5).

− The environmental regulation: *"The Provincial Council shall lay down an environmental regulation containing rules relating to the physical environment"* (Environment and Planning Act of 2016, art. 2.6).

The term *physical environment* comprises *"buildings, infrastructure, water systems, water, soil, air, landscapes, natural environment, cultural heritage, world heritage"* (Environment and Planning Act of 2016, art. 1.2).

In addition to these three key instruments, the Environment Act introduces other two important policy development tools:

− environmental strategies: each municipal council and provincial council shall determine an environmental strategy containing "a. a description of the main features of the quality of the physical living environment, b. the broad outlines of the proposed development, the use, management, protection and preservation of the territory, c. the principal aspects of the entire policy to be pursued in relation to the physical environment" (Environment and Planning Act of 2016, art. 3.2). The strategy has a long-term planning horizon and it is mandatory for the State and provinces, while is optional for municipalities;

− environmental programmes: the State, the province, the water board and the municipality may adopt environmental programmes, which include *"a. an elaboration of the policy to be pursued for the development, use, management, protection or preservation of this, b. measures in order to fulfil one or more environmental values or to achieve one or more other objectives relating to the physical environment"* (Environment and Planning Act of 2016, art. 3.5). Compared to strategies, programmes work within a shorter time horizon, unless planning and management of investments are concerned. Moreover, while a strategy is characterized by a unique and integrated policy for the physical environment, a programme has a multi-sectoral approach and can relate to a domain or a part of the territory for which an administrative body is responsible.

Environmental strategies and programmes are binding upon the administrative body that determines them, are not subject to any hierarchy and do not have any legal effect, not even in dealings between different levels of government.

Together with the planning instruments previously described, the legislative bill also introduces two instruments for the creation of activities with an impact on the physical environment, which require prior permission. These two instruments for project decision-making are:

— the environmental permit: the activities subject to an obligation to obtain an environmental permit include *"a. a construction activity, b. a deviating activity, c. an activity concerning a nationally listed building, d. an earth removal activity, e. a deposition activity at sea"* (Environment and Planning Act of 2016, art. 5.1). An application for an environmental permit can be submitted for one or more activities simultaneously. Submitting one application for two or more activities enables a joined-up assessment of the activities concerned against the applicable assessment rules, and that regulations attached to a permit can be better coordinated in terms of content. This procedure simplifies things for the initiator, who will receive one decision from one administrative body;

— the project decision: it is a generic arrangement for decision-making that relates only to high-impact or complex projects with a public interest that involve either a provincial or national interest or a water management interest. The main goal of this instrument is to offer a flexible procedure for promoting both public and private initiatives that have a public interest. The main advantage of this instrument is that *"In so far as that has been expressly provided for in the project decision, the project decision shall be regarded as: a. an environmental permit for activities in implementation of the project decision, b. a decision designated by an order in council in accordance with the rules stated in that order"* (Environment and Planning Act of 2016, art. 5.52), which means that that all authorizations for the project are given through just one decision.

REFERENCES

Consultation on proposed changes to national planning policy (2015). Department for Communities and Local Government, London (UK). Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/488276/151207_Consultation_document.pdf

Environment and Planning Act. Rules on the protection and utilisation of the physical environment (2016). Ministry for Infrastructure and Environment, Den Haag (NL). Available at: https://www.government.nl/topics/spatial-planning-and-infrastructure/documents/reports/2017/02/28/environment-and-planning-act

National Planning Policy Framework (2012). Department for Communities and Local Government, London (UK). Available at: https://www.google.de/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0ahUKEwiF7srUme_UAhVDUlAKHShNB9oQFggnMAA&url=https%3A%2F%2Fwww.gov.uk%2Fgovernment%2Fuploads%2Fsystem%2Fuploads%2Fattachment_data%2Ffile%2F6077%2F2116950.pdf&usg=AFQjCNEZH3S9fP1GtDXc5onVZtEyTRVG5g

Papa, R., Gargiulo, C., & Zucaro, F. (2014). Climate Change and Energy Sustainability. Which Innovations in European Strategies and Plans. Tema. Journal of Land Use, Mobility and Environment, 0. doi:http://dx.doi.org/10.6092/1970-9870/2554

04

REVIEW PAGES: URBAN PRACTICES

GENNARO ANGIELLO
TeMALab – Università degli Studi di Napoli Federico II, Italy
e-mail: gennaro.angiello@unina.it

In this number

ADVANCING CAR-SHARING: TWO ITALIAN CASE STUDY

Shared mobility options such as car sharing, bike sharing and ridesourcing have the potential to disrupt the current transportation system and to help creating a more sustainable one. This idea is supported by the incessant growth of shared mobility options worldwide and by a relatively large literature assessing its benefits. Car sharing (CS), in particular, has grown steadily over the past few decades, especially in densely-populated metropolitan areas, where the number of CS users has increased from 0.35 million in 2006 to 4.94 million in 2014 (Frost and Sullivan, 2014).

The primary elements that have fuelled the growing popularity of CS include the economic savings for CS users and the environmental benefits for the whole community. As car operation and maintenance costs have been increasing, CS has become an effective way to reduce car ownership costs, while providing new mobility options. The environmental benefits of CS use include reductions in vehicle ownership, vehicle kilometres travelled (VKT), and greenhouse gas emissions (Baptista et al., 2014).

Usage of relatively fuel-efficient CS vehicles is another environmental benefit. Other identified benefits include the growing use of public transit and non-motorized modes, and the contribution that CS can make to help resolve urban parking shortages (Shaheen et al., 2010). Furthermore, the reduced needs for off-street parking space can be used by governments to create additional public spaces for non-motorized modes (Shaheen et al., 2010).

The roots of today's car-sharing schemes can be traced back to the late 1940s, when the first schemes were conceived to share a useful, yet expensive, asset - the car. It was, however, only in the early 1990s that rising fuel prices and congested road networks paved the way for a successful revival of the idea of car-sharing. Since then, technology has played an increasingly important role in expanding this new potential by providing user-friendly systems and efficient allocation strategies, also leading to the development of new CS schemes such as peer-to-peer car-sharing, or free-floating car-sharing.

In Italy, CS has gained increasing importance over the last decade, due to the coexistence in the same market of state-level interventions, independent local operators, and international players (Laurino and Grimaldi, 2012). In this context, this contribution presents two relevant Italian case studies where CS schemes have been successfully implemented in recent years: Milan and Rome.

MILAN

Milan is capital of the Lombardy region and the second most populous city in Italy, with an urban population of over 1,369,000 inhabitants. Milan is served by the most extended public transport network in Italy and it is considered a leading city for sharing mobility both in Italy and abroad (Boscacci et al., 2014).

Milan is a pioneer in Italy for CS since it had formerly two organizations providing the service. The first one, *Carsharing Italia*, was created in 2001 by the environmental association *Legambiente*. The second one, *GuidaMi*, born in 2004, was a joint initiative of the Municipality of Milan and the Italian Ministry of the Environment. In 2007, *Azienda Trasporti Milano*, the Local Public Transport Authority, took control of *GuidaMi*, and, in 2010, it acquired the assets of the other CS operator in Milan, *Carsharing Italia*. *GuidaMi* is a two ways service (i.e. car should be returned to the initial location). Users can reserve their car by the internet or call-centre, choosing the time and the pick-up location, among 88 access points distributed within the city. GuidaMi has adopted a number of incentives to increase CS memberships, including free access to limited traffic zones, the use of public transport reserved lines, and discount on the annual fee. Furthermore, a one-year free membership is offered for people who decide to scrap their own car and become CS member.

The number of *GuidaMi* users has increased from 1000 in 2006 to 5000 in 2012 (Laurino and Grimaldi, 2012). The increase in the number of members can be partly attributed to the introduction, in January 2008, of a charging scheme, known as Ecopass, applied at the most polluting vehicles entering the city centre. The major effect has been a shift towards cleaner vehicles (including CS vehicles) and an increase in the use of public transport (AMAT, 2012). On January 2012, following a public consultation, the Ecopass scheme has been substituted by a new charging scheme, known as Area C, focused on congestion rather than pollution. This new scheme and the shift in the parking policy for CS cars from garages, to on street parking (entailing greater visibility) can in part explain the increase in membership from 2012 onwards.

While the *GuidaMi* initiative is considered a milestone for the development of CS in Milan, the business model has changed and, from 2012, a number of new players has started populating the Milan CS ecosystem. Services such as *E-vai* and *Eq sharing* has entered the market. The first one, *E-vai*, provides connections (through the use of electric vehicles) between the Linate and the Malpensa airports and 40 key destinations within the city. The second, *Eq sharing* (a partnership between the Municipality of Milan, Ducati Energia, Microsoft Internet Explorer and Telecom Italia) provides access to 120 electric vehicles that can be picked up in 15 different access points. Both *E-vai* and *Eq sharing* are station-based services (i.e. cars can be picked up and returned in predefined parking areas).

Beside these services, in the recent years, three new private free-floating services has entered the market. These includes *Enjoy* (Eni Group), *Car2go* (Mercedes Daimler group), and *Drivenow* (BMW group).

The importance of CS for the development of a more sustainable transportation system is widely recognized by the Municipality of Milan, and CS represents an integral part of Milan' strategy for greener and smarter transportation system, as described in the recently adopted Sustainable Urban Mobility Plan (Municipality of Milan, 2015). As of June 2016, there are more than 370.000 CS members in the city of Milan (ONSM, 2016) that can enjoy a mix of CS scheme (e.g. station-based and free-floating), different rates and vehicle typologies, and a variety of incentives that changes from one operator to another. These numbers make the city of Milan a leading city for CS initiatives both in Italy and abroad.

ROME

Rome is the capital of Italy and its largest city, with an urban population of 2,874,529 inhabitants. Rome is considered a car-oriented city, with a very high level of automobile ownerships (more than 700 for 1,000 persons) and high levels of traffic congestion.

Car sharing in Rome was first introduced in 2005 by *Roma Servizi per la Mobilità* (the Local Public Transport Authority) within a project funded by the European Commission. Despite its initial modest implementation, (i.e. only 200 members in its first year) the initiative soon proved to be popular and therefore worthy of progressive expansion within the city. The service initially covered only the central areas of the city but, from June 2007, it was extended to other central boroughs. In October 2009, Car Sharing Roma was implemented further, adding parking areas and cars within the boroughs already served. In order to integrate the car-sharing scheme with the public transportation service, all new car-sharing account holders were issued with regional public transport cards in 2009. By 2011, the service offered 106 cars and 61 parking lots.

Despite its continuous extension, the service do not cover the whole city. Some suburban areas such as Ostia and Tor Vergata are indeed not covered by the service. Car Sharing Roma is a station-based services (i.e. cars can be picked up and returned in predefined parking areas).

Beside Car Sharing Roma, in the recent years, several new player entered the market, offering new and more appealing free-floating services. The first one was Car2Go. Launched in March 2014, it has a fleet of 570 cars and covers a total area of 89 square kilometers. The main private competitor of Car2Go in Rome is the platform Enjoy that count of 455 vehicles that can be picked up and parked within a cover area of 52 square kilometers. Enjoy was also the first platform to introduce scooter sharing in Rome, a service that has been highly appreciated and that has been further developed by other sharing mobility initiatives such as *2hiresharing* (with a fleet of 100 electric scooters), Zig Zag (with a fleet of 400 three-wheels scooters), and *Scooterino*. The latter is a scooter pooling services, similar to Bla Bla Car, as it connects drivers and passengers willing to travel together and share the cost of the journey. Finally, *E-go* is another CS service that has been specifically developed for students and professors of the Roma Tre University. Another interesting aspect of CS in Rome is the development of new mobile phone app, such as *Everyride*, an aggregator of all CS (and bike sharing) services available in the city of Rome that displays on a single map all the shared mobility option for a predefined journey.

The Municipality of Rome considered CS as an important asset for the sustainable development of its transportation system. CS in Rome indeed play a key role in providing mobility options, especially for people living outside the city-center, where public transport options are relatively scares. For this reason, CS members enjoy significant benefits like entering the traffic restricted-areas (basically, the center) and free parking on the streets (that normally would cost at least 1 euro per hour). CS enhancement is also an important strategy in the Rome's Sustainable Mobility Urban Plan (Municipality of Rome, 2016) that consider CS as a complementary rather than concurrent mobility option and a prominent solution for the first/last mile transport problem.

As of June 2016 there are more than 220.000 CS members in the city of Rome and the number is expected to grow in the forthcoming years (ONSM, 2016).

REFERENCES

Baptista, P., Melo, S., & Rolim, C. (2014). Energy, environmental and mobility impacts of car-sharing systems. Empirical results from Lisbon, Portugal. *Procedia-Social and Behavioral Sciences, 111*, 28-37. doi: https://doi.org/10.1016/j.sbspro.2014.01.035

Boscacci, F., Maltese, I., & Mariotti, I. (2014). Smartness and Italian cities. A cluster analysis. *Tema. Journal of Land Use, Mobility and Environment*. Special issue: INPUT 2014, 37-49. doi: http://dx.doi.org/10.6092/1970-9870/2512.

Forst and Sullivan (2014). Carsharing: evolution, challenges and opportunities. Available at: http://www.statistica.com.

Laurino, A., & Grimaldi, R. (2012). The Italian way to carsharing. Tema. Journal of Land Use, Mobility and Environment, 5(3), 77-90. doi: http://dx.doi.org/10.6092/1970-9870/942.

ONSM – Osservatorio Nazionale Sharing Mobility (2016). La sharing mobility in Italia. Numeri, fatti e potenzialità. Available at: http://osservatoriosharingmobility.it/wp-content/uploads/2016/11/Rapporto-Nazionale-SM_DEF_23_11_2016.pdf.

Shaheen, S. A., Rodier, C., Murray, G., Cohen, A., & Martin, E. (2010). Carsharing and public parking policies: assessing benefits, costs, and best practices in North America. Available at: http://innovativemobility.org/wp-content/uploads/2015/03/Carsharing-and-Public-Parking-Best-Practices.pdf.

IMAGE SOURCES

The image shown in the first page is from http:// dribbble.com/; the image shown in the second page is from: http://architecturaldigest.com; the image shown in the third page is from http://visitphilly.com.

05

METHODS, TOOLS AND BEST PRACTICES TO INCREASE THE CAPACITY OF
URBAN SYSTEMS TO ADAPT TO NATURAL AND MAN-MADE CHANGES 2(2017)

REVIEW PAGES: NEWS AND EVENTS

ANDREA TULISI
TeMALab – Università degli Studi di Napoli Federico II, Italy
e-mail: andrea.tulisi@unina.it

In this number
DECISION SUPPORT TOOLS FOR RESILENT CITIES

A plethora of methods and tools has been used by professional planners over many years to support their various planning activities in different contexts. In particular, since the early Nineties, the scientific community has been questioned on tools and methods of application of the newly developed Geographic Information Science to town planning, with a focus on potential contributions in supporting the government of urban transformation (Huxhold, 1991; Batty & Densham, 1996). In fact, Geographic Information Systems (GISs) have the enormous capacity and speed to store, organize, access, and process data. Consequently, the use of GISs improved the availability and accessibility of the specific knowledge domain of the computer system to solve spatial problems. Furthermore, computerized systems may offer the facility of validation and verification of presented knowledge. A decisive step towards a strategic approach is the development of spatial decision support system (SDSS) and Planning Support System (PSS), defined as "geo-information technology-based instruments that incorporate a suite of components that collectively support some specific parts of a unique professional planning task" (Geertman 2008).

Until a few years ago, the lack of information was one of the main constraints in the development of spatial analysis in support of the government of urban transformation. Nowadays, thanks to the availability of new data sources offered by Web 2.0, a gradual sharing of information assets by public administrations (open data) is possible and it refers to the broader discipline of open government.

These data can be used to describe different urban phenomena as well as to predict and evaluate possible scenarios through the use of the above mentioned tools, thus helping decision-makers to weigh costs and benefits of different policies and justify investments. These possibilities given by the fast development of information technology are increasingly important nowadays when cities are expected to undertake concrete actions to adapt both to natural disasters exacerbated by climate change and climate variability and to the socio-economic changes affecting the advanced societies.

This is the reason why in the last years a big number of decision support tools where developed for supporting adaptation and mitigation policies at urban scale. The latest can be classified in two categories:

- web-based decision support tools basically designed to visualize climate change impacts such as storm surge, sea level rise, heat, habitat, forestry or agriculture, allowing users to display impacts based on two or three different climate change assumptions, such as predictions with or without mitigation;
- decision support tool software. These are designed mostly for technical users, in order to integrate local data with regional and national data, and to conduct comprehensive analyses of a limited number of issues or strategies such as the vulnerability of critical infrastructure, or cost/benefit analysis for measuring and balancing environmental and economic objectives.

Despite the increasing diffusion and the constant development of these tools, a few limits for their effective use in local climate mitigation and resilience planning still exist, such as:

- the gap in the availability of consistent locally relevant data for climate resiliency planning, unlike what happens at the national scale where climate science has collected a huge database of information throughout the last twenty years;
- the necessity to overtake the sectorial approach that characterize most of the developed tool; it results still unsuitable to describe the impact of an external event on the complex dynamics of the urban system;
- the necessity to develop a tool functionality that supports integration and collaboration among city departments that would enable regional planning with local implementation (Balaban & Senol Balaban 2015).

The selected conferences and workshops represent a fertile occasion to be updated on the latest developments in the field of the decision support tools for climate change in terms of both software evolution and future challenge to deal with.

IMPACTS WORLD 2017: COUNTING THE TRUE COSTS OF CLIMATE CHANGE
Where: Potsdam, Germany
When: 11-13 October 2017
www.impactsworld2017.org

Most cities have GHG reduction targets and mitigation goals; however, some of the climate mitigation benefits are harder to measure and monetize. This is the main topic of Impacts World 2017 Conference that will be focused on one of the most pertinent and pressing political questions of the day: counting the true costs of climate change. The conference will address this issue by considering four key challenges for quantifying climate-change risks and impacts:

- *Counting the economic costs of climate change*. Climate change can have huge impacts on the distribution of income, wealth, and adaptive capacities of cities. For this reason, economic-cost assessment requires a more comprehensive quantification of economic losses, reflecting risk and uncertainties, thus opening the debate on several questions, such as: How can economic costs be aggregated across spatial scales, e.g. using location-specific vulnerabilities? How can we incorporate and evaluate non-monetary losses? What about appropriate indicators of wellbeing beyond GDP; how are these affected by climate-change? How can we capture distributional consequences and what do these mean for poverty?
- *Climate change and human migration*. The frequency and intensity of extreme weather and climate events, together with the prolonged effects of enduring changes to climatic conditions on food systems and water availability, are contributing to the increasingly frequent migratory phenomenon. For this reason, understanding how can the influence of climate change on migration be separated from other

influences or what is the relationship between migrants and societies in regions of origin as well as destination, it becomes important to intelligently distribute the funds allocated to the fight against climate change on a global scale;

— *Climate Change and human health*. The propagation of diseases due to extreme heat stress, nutritional shortages, and the deterioration of air quality are among the most pressing issues likely to be addressed by considering also the possible economic consequences coming from the impacts on labor productivity;

— *Climate change and the Sustainable Development Goal*. This topic intends to investigate on the relationship between climate action and the other 16 Sustainable Development Goals adoped by the United Nations in 2015.

2017 SWAT CONFERENCE
Where: Selangor, Malaysia
When: 23-26 October 2017
http://swat.tamu.edu/conferences/2017-malaysia/

The Soil and Water Assessment Tool (SWAT) is a public domain model jointly developed by USDA Agricultural Research Service (USDA-ARS) and Texas AgriLife Research. It is a river basin-scale model developed in order to simulate the quality and quantity of surface and ground water and predict the environmental impact of land management practices on different soil patterns and land use patterns. It is widely used in assessing soil erosion prevention and control, non-point source pollution control and regional management in watersheds. 2017 SWAT conference represents an opportunity for professionals, scientists and researchers to review the results of researches carried on with this tool, to share information about latest innovations developed and to discuss further challenges to address. The conference proposes also practical SWAT workshop, organized in four parallel session, open to the participants in order to investigate hydrologic and water quality issues in watersheds and rivers.

THINKNATURE PLATFORM LAUNCH
Where: Internet
When: 27th October 2017
www.think-nature.eu/

In addition to the development of specific tools useful to address the phenomenon of climate change, in recent years, numerous web platforms are springing out for sharing best practices, innovative solutions and research projects on this issue.

This is the context of the project ThinkNature, a web platform founded by the EU Framework Programme for Research and Innovation, which will be launched on the web next October. The objective of the ThinkNature project, executed by a consortium of 17 partners originating from 8 countries across Europe led by the Technical University of Crete, is the development of a platform that supports the understanding and the promotion of nature based solutions (NBS).

NBS are solutions inspired and supported by nature that should provide, in a cost-effective way, social environmental and economic benefits, preserving ecosystem services that are necessary for human life and mitigating the negative effects of climate change.

WORKSHOP TOOLS FOR URBAN RESILIENCE AND CLIMATE ADAPTATION

Where: Amsterdam, Nederland
When: 3rd November 2017
https://www.deltares.nl/en/workshop-tools-for-urban-resilience-and-climate-adaptation/

The workshop is organized by Deltares, an independent institute based in the Netherlands for applied research in the field of water and subsurface. It provides the opportunity to learn about the functionality and application possibilities of tools that support the realization of urban climate adaptation and resilience to flooding. The tools that are presented in the workshop have been created to assist in dealing with this challenge. They can support urban planners, municipalities and other stakeholders in the process of identifying risks, selecting and designing solutions and making investment decisions. The tools that will be shown are the followings:

− Aqueduct Global Flood Analyzer useful to investigate river flood impacts;

− PEARL knowledge base platform, useful to prepare for extreme events in coastal regions;

− 3Di, instrument created for water management, calamity management and spatial planning;

− Circle, a software able to analyze and visualize the propagation of cascading effects of natural disasters through critical infrastructure networks;

− Adaptation Support Tool; this tool was developed as an instrument to select and design adaptation measures for an area and calculate their adaptive capacity.

REFERENCES

Balaban, O. & Şenol Balaban, M. (2015). Adaptation to Climate Change: Barriers in the Turkish Local Context. *Tema. Journal of Land Use, Mobility and Environment, 0*, 7-22. doi: http://dx.doi.org/10.6092/1970-9870/3650

Batty, M. & Densham, P. (1996). Decision Support, GIS and Urban Planning. *Sistema Terra*, 5 pp. 72-76. Available at: http://discovery.ucl.ac.uk/1392297/

Geertman, S. (2008). Planning support systems: a planner's perspective. In R. Brail (Ed.), *Planning support systems for cities and regions* (pp. 213–230). Cambridge MA: Lincoln Institute for Land Policy. ISBN: 978-1-55844-182-8

Huxhold, W. E. (1991). *An introduction to urban geographic information systems*. New York, NY, USA: Oxford University Press. ISBN: 0195065352

IMAGE SOURCES

The image shown in the first page is taken from: https://www.deltares.nl/en/people-living-cities/

AUTHORS' PROFILES

Gennaro Angiello

Engineer, Ph.D. student in Civil Systems Engineering at the Federico II University of Naples. His research interests are in the field of accessibility analysis and modeling, land-use and transport interactions and sustainable mobility. He is currently involved in the research project Smart Energy Master and in the COST Action TU1002 accessibility Instruments for Planning Practice in Europe.

Gerardo Carpentieri

Engineer, graduated in Environmental and Territorial Engineering at the University of Naples Federico II with a specialization in governance of urban and territorial transformations. Since 2014 he has been a PhD student in Civil Systems Engineering at the Department of Civil, Building and Environmental Engineering – University of Naples Federico II. In July 2013 he won a scholarship within the PRIN project on the "Impacts of mobility policies on urban transformability, environment and property market". Since 2011 he represents the UISP (Italian Union Sport for all) in the Forum Civinet Italy. In December 2012 he started collaborating with TeMA Lab.

Maria Rosa Tremiterra

Engineer, Ph.D. student in Civil Systems Engineering at University of Naples Federico II. She received a master's degree in Architecture and Building Engineering with a thesis on sustainable mobility in the European cities. In 2014, she won a grant for post-lauream education and research within the Project Smart Energy Master at the Department of Civil Engineering, Building and Environmental Engineering, University of Naples Federico II. In 2015, she obtained a 2nd level postgraduate Master degree in Municipal Planning at University of Naples Federico II.

Laura Russo

Engineer, Ph.D. student in Civil Systems Engineering at University of Naples Federico II. She received a master's degree in Architecture and Building Engineering with a thesis on urban expansion and the sprawl phenomena, with particular attention for Campania.

Andrea Tulisi

Architect, graduated in Architecture from the University Federico II in Naples in 2006. In January 2014 he holds a PhD in Environmental Technology with a research focus on rehabilitation strategies for semi-enclosed spaces in the "Compact City". He is currently involved within the project Smart Energy Master with DICEA department of the University of Naples Federico II; his research activity is focused on the link between urban open spaces and energy consumption.