



Co-funded by the
Erasmus+ Programme
of the European Union



**Training for Education Learning and Leadership
towards a new METropolitan Discipline**

Inaugural Book



TELLme – Training for Education, Learning, and Leadership towards a new METropolitan Discipline (Grant Agreement No. 2017-1-IT02-KA203-036974) is co-funded by the Erasmus+ Programme of the European Union. The European Commission's support for the production of this publication does not constitute an endorsement of the contents, which reflect the views only of the authors, and the Commission cannot be held responsible for any use which may be made of the information contained therein.

Training for education, learning and leadership towards a new metropolitan discipline. Inaugural book

© 2021 CIPPEC

www.cippec.org

Buenos Aires, Argentina

Editorial coordinator: Melina Nacke

Editor: Patrizia Giordano

Authors in alphabetical order: Saúl Alcántara Onofre, Antonella Contin, Gianluigi Contin, Blanca del Espino Hidalgo, Rafael Forero, Valentina Galiulo, Fabio Gallo Perozzi, Marco Kamiya, Jiyeon Kim, Gabriel Lanfranchi, Massimiliano Lepratti, Emilio J. Mascort-Albea, Guglielmo Mormina, Melina Nacke, Alessandro Oggioni, Pedro Ortiz, Gabriela Pastor, Roberto Randazzo, Ramón Reyes Rodríguez, Domingo Sánchez Fuentes, Santiago Soubie, Paolo Tagliolato Acquaviva d'Aragona, Carlos Tapia, Laura Torres & Andrej Žižek

Covers designers: Valentina Galiulo & María Koeraus

Interior designer: María Belén Félix

We will also like to thank Michael Cohen, Wang Hongyang, Cesar Jaimes, Giovanni Santamaria, Fernando Bercovich and Stefano Sanna for their contributions to this book.

This book was subject to blind review.

ISBN: 978-987-1479-50-4

First edition

To cite this document: Contin, A., Giordano, P. and Nacke, M. (eds.). (2021). Training for education, learning and leadership towards a new metropolitan discipline. Inaugural book. Buenos Aires: CIPPEC.

**Training for Education, Learning and Leadership
towards a new METropolitan Discipline**

Inaugural Book

Contents

Preface	iv
<i>Sebastián Lew</i>	

Introduction	v
<i>Antonella Contin</i>	

PART I **GENESIS OF THE BOOK**

CHAPTER ONE

The genesis and purpose of metropolitan architecture, its discipline in the era of the bigness at the metropolitan scale	1
<i>Antonella Contin</i>	
Metropolitan political power	15
<i>Pedro Ortiz</i>	
What is a XXI century metropolis?	32
<i>Antonella Contin</i>	

CHAPTER TWO

Metropolitan metabolism: the ecological footprint	41
<i>Domingo Sánchez Fuentes</i> <i>Emilio J. Mascort-Albea</i>	
Equity versus equality as an example of the metropolitan complexity	47
<i>Carlos Tapia</i>	
Metro Gaps. A method to understand and guide sustainable metropolitan development	51
<i>Gabriel Lanfranchi</i>	
Metropolitan architecture	56
<i>Antonella Contin</i>	

CHAPTER THREE

The Metro-dology	77
<i>Antonella Contin</i> <i>Pedro Ortiz</i> <i>Jiyeon Kim</i>	
The six steps on a path towards agreement, between subjects with potentially divergent interests and objectives	93
<i>Gianluigi Contin</i> <i>Guglielmo Mormina</i>	

CHAPTER FOUR

Metropolitan cartography: practice, tactics and projects	97
<i>Antonella Contin</i> <i>Valentina Galiulo</i>	
Metropolitan discipline, a terminology	104
<i>Ramón Reyes Rodríguez</i>	
TELLme project as a tool for territorialising SDGs in metropolises	112
<i>Rafael Forero</i>	

PART II

AN IMPERFECT THEORY

CHAPTER ONE

The metropolitan genome	123
<i>Pedro Ortiz</i>	
The sustainable metropolitan heritage. A profound mutation in our relation to the world	151
<i>Blanca del Espino Hidalgo</i>	
Sustainable natural and cultural heritage	158
<i>Saúl Alcántara Onofre</i>	

CHAPTER TWO

The Metro-Matrix	163
<i>Pedro Ortiz</i> <i>Antonella Contin</i>	
Principles, operators and operations	173
<i>Antonella Contin</i>	
Urban economy and planning in a changing world	182
<i>Marco Kamiya</i>	

PART III

THE RULES OF METROPOLITAN SHAPE

CHAPTER ONE

Rules of urban-metropolitan shaping and re-shaping	193
<i>Ramón Reyes Rodríguez</i>	
Rules of metropolitan governance	206
<i>Melina Nacke</i> <i>Santiago Soubie</i>	

Rules of metropolitan relations between urban and rural landscapes	212
<i>Gabriela Pastor</i>	
<i>Laura Torres</i>	

Rules of metropolitan quality and beauty	216
<i>Antonella Contin</i>	

CHAPTER TWO

Metropolitan wealth and prosperity	223
<i>Andrej Žižek</i>	

The circular economy	231
<i>Massimiliano Lepratti</i>	

Social infrastructures and impact economy	236
<i>Roberto Randazzo</i>	
<i>Fabio Gallo Perozzi</i>	

PART IV

TOOLS AND TRAINING

CHAPTER ONE

Cartography and open data	242
<i>Paolo Tagliolato Acquaviva d'Aragona</i>	
<i>Valentina Galiulo</i>	
<i>Andrej Žižek</i>	
<i>Alessandro Oggioni</i>	

Metropolitan training	251
<i>Andrej Žižek</i>	

Metropolitan tools: the TELLme Hub and the TELLme virtual lab.....	257
<i>Paolo Tagliolato Acquaviva d'Aragona</i>	
<i>Alessandro Oggioni</i>	

About the partners	265
---------------------------------	------------

Chapter two

Metropolitan behaviour

Metropolitan metabolism: the ecological footprint²⁵

Domingo Sánchez Fuentes

Universidad de Sevilla

Emilio J. Mascort-Albea

Universidad de Sevilla

Times of great uncertainty and serious risk are being experienced as a result of the high pressure imposed by human action on the planet's biosphere, which has exceeded the carrying capacity of natural ecosystems. It is becoming increasingly evident that this circumstance may irreversibly alter the biogeophysical dynamics that explain human existence itself.

An updated overview of the Millennium Ecosystems

Some indicators are very clear about the environmental imbalance that is currently occurring (Intergovernmental Panel on Climate Change -IPCC-, 2019; Credit Suisse Research Institute, 2019), and its effect on the health of the world's population. Consequently, the state of climatic emergency that is being experienced in this historical period has been clearly stated by the main international institutions (World Meteorological Organization -WMO-, 2019; United Nations Environment Programme -UNEP-, 2016; United Nations Development Programme -UNDP-, 2019), and clearly perceived by measures related to the reduction of the life cycles of tree species (Hubau et al., 2020) or the level of pollution supported (European Environmental Agency -EEA-, 2019). Through

²⁵ To cite this article: Sánchez Fuentes, D. and Mascort-Albea, E. J. (2021). Metropolitan metabolism: the ecological footprint. In: Contin, A., Giordano, P. and Nacke, M. (eds.). (2021). Training for education, learning and leadership towards a new metropolitan discipline. Inaugural book. Buenos Aires: CIPPEC.

published data, premature mortality due to air pollution is predicted to reach nine million people per year (Lelieveld et al., 2020; Burnett et al., 2018).

It is a certitude at the beginning of the third decade of the 21st century, in the age of the Anthropocene, that we are in a situation of universal health emergency caused by the COVID-19 pandemic, and immersed in the context of a dramatic scene within many of the metropolises that previously felt strong and safe. This immense health crisis must contribute to face, this time on time and with sufficient clarity, the greatest social, ecological, economic, and also health challenge of the 21st century: Climate Change (Salazar-Galán, 2020).

Approach to the concept of metropolis. The need for a paradigm shift

The word metropolis has been used since its Greek origin in the context of colonization (Consejo nocturno, 2018). This concept constitutes nowadays the new biopolitical nomos of the planet, which arises when the modernization process has been concluded and nature has disappeared (Jameson, 1991).

Thus, it is considered that the health status of the metropolises could worsen in the current situation of socio-economic crisis and serious ecological deterioration, because they represent complex urban systems that could offer particularly vulnerable profiles in the face of global eco-social destabilisation²⁶.

In order to try to provide healthy living systems capable of living together in a fragile and finite biosphere, it is necessary to initiate: "transitions around universal coverage of social and gender rights, preservation at all costs of life cycles and systems, and reconfiguration of values, logic, principles and lifestyles" (Prats et al., 2017).

Comprehensive proposals are required to promote the creation of a vital security space (Raworth, 2014, 2017) in which the socio-economic systems established in the metropolises are sufficient²⁷, providing social welfare, promoting environmental justice and respecting the limits of natural cycles and systems (Felber, 2015). In this sense, the Basque Declaration²⁸ has established the need to propitiate a technological, socioeconomic and socio-cultural transformation of societies with the aim of achieving this scenario in our metropolises (Basque Country, 2016).

This transformation must be based on the following main objectives: decarbonising and reducing overall energy consumption; creating sustainable patterns of urban mobility and accessibility; protecting and enhancing biodiversity and ecosystem services; reducing consumption of undeveloped land and natural spaces; protecting water resources and air quality; adapting to climate change and reducing the risk of disasters; improving public spaces to create living environments; providing sufficient and adequate housing for all citizens; ensuring the social inclusion and integration of all sections of society; and strengthening our local economies and local employment opportunities (Basque Country, 2016).

26 Caused by the following phenomena: strong disconnections and decentralizations in global governance; difficulties in maintaining complex metabolic systems that are highly dependent on supplies in crisis and far away; the incidence of climate change depending on the geographical position of the metropolises; and a foreseeable increase in social conflicts (Prats et al., 2017).

27 For this purpose, it is essential to modify the logic of growth inherent in the Sustainable Development Goals 2030 towards economic models where the objective is sufficient and sustainable human welfare (O'Neill et al., 2018).

"Similar to the model of nature, sustainability requires the creation of a socioeconomic structure based on units that evolve and adapt to their environment to create basic goods primarily from the resources of their territory and in harmony with the natural environment, using local technologies, appropriate for the use of indigenous resources" (Glaser et al., 2008).

28 Prepared at the 8th European Conference on Sustainable Towns and Cities in 2016, this document established a new agenda for European towns and cities by proposing the creation of productive, sustainable and resilient municipalities for a liveable and inclusive Europe.

To promote this transformation, we should be able to initiate an eco-social transition that allows to rethink our metropolis from the theory of systems and the paradigm of complexity (Morin, 1990; García Jiménez, 2014; Laguna Sánchez et al., 2016). Only in this way can we approach its analysis from an organic and not a mechanistic perspective; that is, considering it as an open system with the capacity to maintain a permanent exchange of flows with natural ecosystems, on the basis of which its viability is sustained over time.

Assuming that "every ecosystem is a complex system organized structurally and functionally according to a hierarchical configuration formed by a series of interdependent components" (Montes del Olmo et al., 1998), we conceive the metropolitan ecosystem as a complex entity made up of a set of unique subsystems, with different levels of organization. Through this conception, it is possible to study them at different spatial and temporal scales, which are interconnected (Gallardo Ramírez, 2019). Each of these components functions as ecosystems in which there are interactions between natural and social capital through the flow of ecosystem services and institutional decisions about the territory (Jiménez Herrero, 2016).

Resilient relations in the territory through the concept of Bioregion: Urban metabolism, environmental justice and heritage system

It is necessary to consider metropolises as complex and adaptive socio-ecological systems²⁹ whose continuity is based on their resilience and on the adaptive capacity of the metabolism of the metropolitan socio-ecosystem to the biocapacity of natural ecosystems and to climate change³⁰. All of this has been conceived in the context of a common territorial model, regardless of administrative delimitations, with the need to reach "almost zero" carbon balances before the central decades of this century. In addition, another requirement should be the reconnection of the metropolises with the related rural spaces, promoting management around the bioregions. (Prats et al., 2017).

Resilience applied to spatial planning and management at all scales requires: biological, landscape, social and economic diversity; ecological versatility; implementation of a modular system; slow variables and boundary control; social memory; social capital; innovation; overlaps in governance and maintenance of ecological services (Díez Medina and Monclús, 2018; Walker and Salt, 2006). This approach represents the capacity, and the opportunity, for urban managers to face a crisis situation, adapt to the new situation, and rebuild the process in order to propose new alternatives.

Therefore, the resilience of the metropolitan socio-ecosystem must be based, within the scope of the bioregion³¹, on the correct definition and configuration of its Heritage System, on the balance of its Urban Metabolism and on the establishment of Environmental Justice. These elements must assume a fundamental role in the formulation of new development logics that allow us to "move towards more sober and simple economies, with balanced ecological, energy and carbon footprints in relation to the biocapacities of the bioregion" (Prats et al., 2017). In turn, these new patterns of action must offer adequate support for life, optimize self-sufficiency and proximity in basic resources

29 Based on the following definition: "a complex adaptive system is one that is made up of a dynamic network of adaptive agents, which act and react to the actions of other agents, on which their behavior depends. These systems can have very diverse natures, both of biological origin, and artificial, material, immaterial, etc. (Holland, 1996). Therefore, these systems "are pattern seekers. They interact with the environment, learn from experience and adapt as a result" (Cardona et al., 2011).

30 The concept from resilience of regions and communities facing the effects of climate change is linked to these ideas: "flexibility, adaptability, persistence, self-regulation and self-organization, etc." (García García, 2016).

31 Territorial areas with an ecological and cultural significance, characterized by similar biophysical features, land use and socio-economic context. It is necessary to achieve that the bioregion tends to its sustainability as a socio-ecosystem, promoting "a harmonic, balanced and equitable relationship between a maintained functionality of the natural systems and a rational exploitation of the multiple benefits that these generate" (Borja Barrera and Montes del Olmo, 2008).

and environmental services, and integrate urban, rural and natural realities in a compatible approach.

Achieving these objectives will require the identification of new instruments that help to implement processes for the development of territorial and economic planning and management policies that build socio-ecological resilience. In this way, it is advocated to promote those processes that have greater social value in terms of the quality of the flow of eco-services in the new territorial model³².

The necessary preservation of landscapes for the correct balance of the urban metabolism

This new socio-ecosystemic infrastructure must be supported by the positive network of the bioregion, organized as a modular³³ and polycentric structure. Additionally, it must be constituted by its Heritage System, that is, by the set of cultural or immaterial, natural or anthropic goods that have a social value, as well as by their relationships and interconnections³⁴. The capacity of this landscape structure to articulate and promote socio-territorial identity will help to improve the function of ecological systems as green infrastructures, as connectors for biodiversity and also as elements of adaptation to climate change (Gallardo Ramírez, 2019).

Likewise, it is necessary to analyse the complex interactions that are established in the exploitation of the ecosystems of the bioregion, as an integral part of the new proposed infrastructure³⁵. The aim is to understand and simultaneously manage these relationships in order to preserve their capacity to generate supply and cultural (non-material) services, with the aim of regulating the benefits obtained (Millennium Ecosystem Assessment, 2005). It is precisely these benefits that form the basis of economic, social and cultural development (Montes del Olmo, 2007), and the improvement of the health and well-being of the inhabitants of the metropolises.

Based on the "recognition that human beings and their culture are an integral part of ecosystems and, therefore, the objectives of environmental management are of an eminently social nature" (Paredes Castillo, 2016), the third essential element of the new socio-ecosystemic infrastructure of the metropolises should be the promotion of Environmental Justice³⁶.

We refer to the generation of a more inclusive community, through the definition of strategies of proximity, gender, recovery of identity and promotion of the local economy. These achievements should be based on the production of hybrid spaces for the generation of food and energy, for recycling and for new technologies, shaping a territory equipped and suitable for a community rooted in the place; capable of identifying possible emerging community spaces (Gallardo Ramírez, 2019).

Only through the conception of a reality that must be valued in a collective and synergic way due to its environmental, historical, social, cultural and productive charge, will it be possible to articulate conducts that allow the development of a balanced urban metabolism in the scope of the bioregions.

32 The incorporation of these concepts into the reflection on the planning of the present and the future is encouraging. Recent examples related to European urban regions such as Brussels, Florence or Alava show it.

33 In this particular context, the modular concept refers to the ability to formalize larger structures or systems from modules or structures that are connected but not overlapping. Each of these modules is flexible and capable of adapting to external conditions, without disturbances affecting the whole ecosystem (Walker and Salt, 2006).

34 Based on these approaches, the Lower Lea Valley regeneration (planned for the period 2012-2026) aims to transform the Lea River corridor, located in east London and designed as a space to host the 2012 Olympic Games. This proposal emphasizes the capacity of articulation of the open spaces and their integration in the metropolitan green matrix.

35 Following this line, the project Atelier Rotterdam (2014) proposes an innovative way of mapping the region of Rotterdam, by understanding that the city and its surroundings are interconnected by metabolic flows, whose analysis allows us to work in the search for territorial resilience.

36 This commitment to Environmental Justice is evident in the Qian'an Sanlihe ecological corridor project (2007-2010), located in China. The proposal aims to correct the loss of functionality of natural systems and cultural heritage, through a set of landscape actions that reduce the ecological and social vulnerability of the region.

All this, thanks to the construction of individual visions that, within the framework of a common imaginary, assume the landscape as a reality capable of condensing all those potentialities that should allow a sustainable future, assumed as a legacy for future generations.

References

- Basque Country (2016) 'The Basque Declaration. New Pathways for European Cities and Towns to create productive, sustainable and resilient cities for a liveable and inclusive Europe.', in 8th European Conference on Sustainable Cities and Towns. 2016 Bilbao, Spain: Euskady Basque Country.
- Borja Barrera, F. & Montes del Olmo, C. (2008) 'La gestión ecosistémica como herramienta territorial para la toma de decisiones. Ecorregiones e integración funcional de carreteras y espacios naturales protegidos.', in II Congreso Nacional de Medio Ambiente en Carreteras.
- Burnett, R. et al. (2018) Global estimates of mortality associated with long-term exposure to outdoor fine particulate matter. *Proceedings of the National Academy of Sciences*. 115 (38), 9592–9597.
- Cardona, R. et al. (2011) Circadiana en el paisaje urbano desde la epistemología compleja. *Orbis. Revista Científica Electrónica de Ciencias Humanas*. 18 (7), 82–115.
- Consejo nocturno (2018) *Un habitar más fuerte que la metrópoli*. Logroño, Spain: Pepitas de calabaza.
- Credit Suisse Research Institute (2019) *Global wealth report 2019*.
- Díez Medina, C. & Monclús, J. (2018) *Urban Visions*. Carmen Díez Medina & Javier Monclús (eds.). Cham: Springer International Publishing.
- European Environmental Agency -EEA- (2019) *Air quality in Europe (2019 report)*. EEA Report No 10/2019. Luxembourg: Publications Office of the European Union.
- Felber, C. (2015) *Change Everything: Creating an Economy for the Common Good*. Croydon, UK: CPI Group.
- Gallardo Ramírez, C. (2019) *Método de evaluación para la regeneración integrada del espacio turístico litoral: la costa del sol occidental*. Universidad de Sevilla.
- García Jiménez, R. (2014) *Teoría general de sistemas y complejidad. Contribuciones a las Ciencias Sociales*.
- García García, M. (2016) *Desmontando la paradoja de la sostenibilidad*. *Ambienta*. 4–22.
- Glaser, M. et al. (2008) Human/Nature Interaction in the Anthropocene Potential of Social-Ecological Systems Analysis. *GAIA - Ecological Perspectives for Science and Society*. 17 (1), 77–80.
- Holland, J. H. (1996) *How Adaptation Builds Complexity*. New York, USA.: Basic Books.
- Hubau, W. et al. (2020) Asynchronous carbon sink saturation in African and Amazonian tropical forests. *Nature*. 579 (7797), 80–87.
- Intergovernmental Panel on Climate Change -IPCC- (2019) *2019 Refinement to the 2016 IPCC Guidelines for National Greenhouse Gas Inventories*. Kanagawa, Japan: Institute for Global Environmental Strategies.
- Jameson, F. (1991) *Postmodernism, or, the cultural logic of Late Capitalism*. Durham, U.K.: Duke University Press.
- Jiménez Herrero, L. M. (2016) *Hacia ciudades y territorios inteligentes, resilientes y sostenibles. Gestión y Gobernanza para la gran transición urbana*. Madrid, Spain: Asociación para la Sostenibilidad y el Progreso de las Sociedades (ASYPS).
- Laguna Sánchez, G. A. et al. (2016) *Complejidad y Sistemas Complejos: Un acercamiento multidimensional*. México D.F., México: CoplitarXives y EditoraC3.
- Lelieveld, J. et al. (2020) Loss of life expectancy from air pollution compared to other risk factors: a worldwide perspective. *Cardiovascular Research*.
- Millennium Ecosystem Assessment (2005) *Ecosystems and Human Well-being. Synthesis*. Washintong DC, USA: Island Press.
- Montes del Olmo, C. (2007) Del desarrollo sostenible a los servicios de los ecosistemas. *Ambienta*. 16 (3), 1–3.
- Montes del Olmo, C. et al. (1998) *Reconocimiento Biofísico de Espacios Naturales Protegidos*. Sevilla, Spain: Consejería de Medio Ambiente. Junta de Andalucía.
- Morin, E. (1990) *Introduction à la pensée complexe*. Paris, France: Editions du Seuil.
- O'Neill, D. W. et al. (2018) A good life for all within planetary boundaries. *Nature Sustainability*. 1 (2), 88–95.
- Paredes Castillo, D. (2016) *Enfoque ecosistémico y corredores de conservación de la biodiversidad*.
- Prats, F. et al. (2017) *Ante el antropoceno. Reflexiones sobre la cuestión biorregional en el País Vasco*.
- Raworth, K. (2014) *A safe and just space for Humanity: Can we live within the doughnut?* London, UK: Oxfam GB.
- Raworth, K. (2017) *Doughnut Economics: 7 Ways to Think Like a 21st Century Economist*. White River Junction, USA: Chelsea Green Publishing.

Salazar-Galán, S. A. (2020) Crisis sistémica y coronavirus (I). Semanario Voz. Available from: <https://semanariovoz.com/crisis-sistemica-coronavirus-i/>

United Nations Development Programme -UNDP- (2019) Human Development Report 2019. Beyond income, beyond averages, beyond today: Inequalities in human development in the 21st century. New York, USA: UNDP.

United Nations Environment Programme -UNEP- (2016) Summary of the sixth global environment outlook (GEO-6) regional assessments: Key findings and policy messages.

Walker, B. & Salt, D. (2006) Resilience Thinking: Sustaining Ecosystems and People in a Changing World.

World Meteorological Organization -WMO- (2019) WMO provisional Statement on the Status of the Global Climate in 2019.