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Focus C: Urban Sprawl and Measures for Environmental Sustainability

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Urban Sprawl: Characteristics and Impacts

The contemporary city has increasingly been characterised by certain distinctive features, in particular by a progressive urban fragmentation and by a polarisation and specialisation of some functions and services outside the urban centres, which resulted in a growing increase of mobility.

The phenomenon, known as *urban sprawl*, is generalised and extended and has been studied extensively in its social, economic, cultural, political and institutional components[6] as well as in its causes, impacts,[7] formal expressions and local specificities, which have led to different manifestations of the phenomenon according to the different territorial and geographical contexts.

[6] About the effects of local scale regulations and sprawl and about the relationship between administrative fragmentation and sprawl increase, see: Pendall R. (1999), "Do Land-Use Controls Cause Sprawl?", *Environment and Planning B*, vol. 26/4, pp. 555–571.

[7] Between the various studies, see Ewing R., Pendall R., and Chen D. (2002), *Measuring Sprawl and Its Impact*, Smart Growth America/U.S. Environmental Protection Agency, Washington, D.C.

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Research has highlighted the close relationship between low-density of settlements and sprawl, as well as new needs, consumption and lifestyles impose high-impact territorial choices with high land use rates.

A topic that over time has become important in research on the effects of the sprawl is the one linked to the quantification of the collective[8] and social costs related to mobility[9] and more recently, the health care costs that the sprawl imposes. Some recent studies in fact highlight the connection between a sprawl and the health of individuals: «The study, *Relationship Between Urban Sprawl and Physical Activity, Obesity, and Morbidity*, found that people living in counties marked by sprawling development are likely to walk less and weigh more than people who live in less sprawling counties. In addition, people in more sprawling counties are more likely to suffer from hypertension (high blood pressure)»[10] as well as the need to act, regulating and limiting the development of sprawling so as to allow improvement the people's quality of life.

Research on the sprawl is also characterised by an approach which takes ever more the form of planning and is ever more linked to identifying common tools, policies and measures that are primarily aimed at limiting land use. The latter is considered the most evident criticality and the one with the larger impact since it is associated with the erosion of natural, environmental and

[8] On this subject, reference should be made, by way of example, to the numerous studies conducted in the United States of America on the *social* and *environmental* costs of sprawl since the 70s: Real Estate Research Corporation (1974), "The Costs of Sprawl" (US Environmental Protection Agency, Washington, DC); Ladd H. (1992), Population growth, density, and the costs of providing public services, *Urban Studies*, 29; Carruthers J., Ulfarsson G.F. (2003), "Urban sprawl and the cost of public services", *Environment and Planning B: Planning and Design*, 30. In the case of Europe and Italy, the amount of research is more restricted: Camagni R., *et al.* (2002), *I costi collettivi della città dispersa*, Alinea, Firenze; Caperchione E. (2003), "Local Government accounting system reform in Italy: A Critical Analysis", *Journal of Public Budgeting, Accounting and Financial Management*, 15(1); Hortas-Rico M., Solé-Ollé A. (2008), "Does Urban Sprawl Increase the Costs of Providing Local Public Services? Evidence From Spanish Municipalities", *Urban Studies*, 47(7); Travisi C.M., *et al.* (2009), "Impacts of urban sprawl and commuting: a modelling study for Italy", *Journal of Transport Geography*, 18(3); Fregolent L., *et al.* (2012), "La relazione tra i modelli di sviluppo urbano dispersi e i costi dei servizi pubblici: un'analisi panel", in Cappellin R., Ferlaino F., Rizzi P. (editors), *La città nell'economia della conoscenza*, Franco Angeli, Milan.

[9] McCann B. (2000), *Driven to spend. The Impact of Sprawl on Household Transportation Expenses*, Surface Trasportation Policy Project, Center for Neighborhood Technology.

[10] McCann B., Ewing R. (2003), "Measuring the Health Effects of Sprawl: A National Analysis of Physical Activity, Obesity, and Chronic Disease", Smart Growth America and Surface Transportation Policy Project, Sep., p. 1.

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landscape resources, and soil sealing.[11] Waterproofing is the result of the strong anthropization caused by the urbanisation processes and leads to the degradation of the ecosystem functions, the alteration of ecological balance, and a series of negative impacts on the environment such as a strong pressure and water resources with consequent decrease in rainfall absorption; loss of biodiversity; impact on food safety; increase in solar energy absorption due to dark asphalt or concrete surfaces, which contribute significantly along with the heat generated by air conditioning and cooling systems, and the heat produced by traffic, to the so-called 'Urban Heat Island' effect.

The evolution of the sprawl phenomenon and the quantification of its impacts have therefore pushed scholars and researchers and then also administrators and politicians to search for the measures to adopt and the possible actions to be implemented through specific and sectoral policies as well as careful planning.

The urban and regional planning may limit the sprawl also by means of infrastructural and transport regulation measures which foster a reduction in greenhouse gas emissions and allow to direct the growth and form of the urban space. In fact, density, functional *mixité*, re-compaction of the urban space, infrastructure design and the promotion of public and collective transport are the principles for developing guidelines for sustainable planning that regulates the urban space in such a way to control and reduce CO_2 emissions. This is how the form of the urban settlement and the planning aimed to regulate its growth that can make an important contribution to climate protection,[12] and this is why even at a European level, one of the major pushes is heading for intervention on the urban form, the compaction of the urban space, and the re-use of abandoned and dismissed areas.

[11] On this subject, please refer to the documents produced by the EU, in particular the Soil Thematic Strategy (COM(2006) 231); and on the measures that may be adopted to mitigate the phenomenon: European Commission (2011), *Report on best practices for limiting soil sealing and mitigating its effects*, Technical Report, 2011-050, Apr., available at: http://ec.europa.eu/environment/soil/pdf/sealing/Soil%20sealing%20-%20Final%20Report.pdf

[12] See: Intergovernamental Panel on Climate Change – IPCC (2014), "Human Settlements, Infrastructure and Spatial Planning", in Edenhofer, O., R. Pichs-Madruga, Y. Sokona, E. Farahani, S. Kadner, K. Seyboth, A. Adler, I. Baum, S. Brunner, P. Eickemeier, B. Kriemann, J. Savolainen, S. Schlömer, C. von Stechow, T. Zwickel and J.C. Minx (eds.), *Climate Change 2014: Mitigation of Climate Change*, *Contribution of Working Group III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, cap. 12, Cambridge, Cambridge University Press, United Kingdom and New York.

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8.1.1 Measures and Tools for Sprawl Containment

The European Union has long been committed to the promotion of a culture of sustainability which over the past two decades has helped to increase attention towards environmental issues and is now a leader with respect to the major environmental issues, from combating climate change[13] to the protection of biodiversity.

As for land and its protection – with special reference to the land use – the measures proposed by the EU collide again with the constraints stemming from the fact that land planning is a matter for the competence of the individual Member States. But other policies that affect to a greater or lesser degree, the land transformation processes and the issue of non-sustainable consumption and soil sealing, are the focus for a number of European Institutions (European Commission, European Environment Agency, and Eurostat), who initiated monitoring programs, research and awareness, although we continue to wait for a specific directive on land that is difficult to achieve.

As previously mentioned, planning is one of the strategic tools identified by the EU for a new enhancement of the city and the control of urban growth to take place in a sustainability manner, because sustainability means a transdisciplinary perspective on phenomena that requires different approaches, opinions and observations, which planning can combine and intersect in order so as to develop effective solutions. For this reason: «The majority of the EU Member States have established the principle of sustainable development in their key spatial planning regulations, referring to economic use of land resources and avoidance of unnecessary urban sprawl. However, the existence of relevant regulations does not give any insight on the effectiveness of implemented measures».[14] In addition, the actions taken by several European

[13] On this subject, a first assessment can be made of the planning measures adopted in the USA: "The first generation of state and local climate change plans reflects increasing consciousness of this, and these plans have begun to take important steps, such as measuring emissions. But much stronger action is needed. Instead of pursuing slow, incremental policy changes, governments at all levels must adopt a *backcasting* approach, setting goals for both mitigation and adaptation based on the best available scientific knowledge, and working backward from these targets to develop plans and programs capable of achieving them. The initiatives would then be regularly reviewed and revised to ensure progress at an appropriate rate" (Wheeler S.M. (2008), "State and Municipal Climate Change Plans. the first generation", *Journal of the American Planning Association*, vol. 74/4, pp. 481–496).

[14] Soil Thematic Strategy (COM(2006) 231); and on the measures to be adopted to mitigate the phenomenon: European Commission (2011), *Report on best practices for limiting soil sealing and mitigating its effects*, Technical Report, 2011-050, Apr., available at: http://ec.europa.eu/environment/soil/pdf/sealing/Soil%20sealing%20-%20Final%20Report.pdf.

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countries and aimed at sustainability-oriented planning are based on: «Quantitative limits for annual land take exist only in six Member States: Austria, Belgium (Flanders), Germany, Luxembourg, the Netherlands, and the United Kingdom. In all cases the limits are indicative and are used as monitoring tools",[15] for example: «In England, 10 % of the total land area, which includes country roads, is urban and, according to the Department for Communities and Local Government (2008), over 70 % of new development is taking place on this previously developed land (i.e., brownfield) at high densities to conserve greenfield land. This is a highly restrictive land use policy, constraining the supply of new houses and limiting lifestyle choice».[16] Similar rules have been adopted in other European countries: in Germany, measures were introduced for progressive control of land consumption with the goal of reaching zero consumption in 2050, by envisaging re-use of brownfield sites, requiring new urbanization to only occur in areas accessible by public transport and urban development plans to be designed in such a way to enhance compact urban centres and provide them with services, such as Active City and District Centres (2008). In France, the "Schémas de la Cohérence Territoriale" (SCOT) – large-scale plans which serve as a guide for the local plans - allow to determine perimeter of the protected natural and urbanized spaces. The SCOTs impose the principle of "extension limitée de l'urbanisation" which establishes limits to the urbanisation of non-anthropized areas and the realization of large commercial spaces.

Different regions in Italy are preparing urban regulations aimed to control land consumption: Regione Veneto is working on a draft law on the reduction of land consumption through urban regeneration; this work began at the end of 2013 but the draft law is still under discussion. Regione Toscana is engaged in reviewing its Regional planning law with the introduction of specific measures to contain land use; Regione Puglia, which has already passed a law to encourage and facilitate access of youth to agriculture and combat the abandonment and consumption of agricultural land.

In addition to planning, the most common tools for urban growth control are greenbelts and urban growth boundaries, applied in different cities around the world (London, Berlin, Portland, Beijing, Singapore, etc.) with the aim of defining and delimiting the physical boundary between the city and the countryside, with the contribution also of fiscal and regulatory measures and other indications such as the re-use of dismissed areas and buildings to encourage

[15] op. cit.

[16] Echenique M.H., Hargreaves A.J., Mitchell G., and Namdeo A. (2012), "Growing Cities Sustainably. Does Urban Form Really Matter?", *Journal of the American Planning Association*, vol. 78/2, pp. 121–137.

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the upgrade of that which is already in existence, and the start of urban regeneration processes in order to prevent consumption of non-anthropized land, to allow construction works to take place on free land only when all dismissed or under-used land is recovered, and when re-use of areas already compromised has been verified to be impossible. In any case the use of free land should be linked to real needs; regulating land use through regulatory restrictions and adopting different local taxation systems for the different areas and uses.

The outcomes of these measures in the various contexts of application were different, and this demonstrates that there is no solution or single measure able to minimize the sprawl but that the measures to be taken must be different and applied in different ways, but all within an unambiguous reference framework to be determined by the planning.

The adjustment and implementation of policies aimed at governing urban transformation must take place at different scales of intervention with a focus on the large-scale and/or metropolitan scale, because this allows understand, contextualize, and find solutions to phenomena that occur on a local scale.

Planning plays a key role, especially on a vast or regional scale, since the processes of urban sprawl affect large areas of land - several municipalities and provinces mutually adjacent. This scale also enables to address issues such as pollutant gas emissions, resource management, reduction of land consumption, protection of natural ecosystems, and also enables to implement welfare policies[17]; and an integrated approach to urban development policies is the only key to implementing the *European strategy for environmental sustainability*.

[17] Wheeler S. (2009), "Regions, Megaregions, and Sustainability", *Regional Studies*, vol. 43/6, pp. 863–876.