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Introductory Chapter: Land-Use Planning and Land-Use Change as Catalysts of Sustainable Development

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1. Land-use planning: paradigm changes and future perspectives – a brief overview

Land-use change has often been one of the main drivers of economic growth, social change and innovations of the government. For this reason, as mentioned by Magalhães [1], the analysis and comprehension of the processes, which throughout time, influenced landscape form and patterns (and thus land use), constitute an essential feature for those aiming to work in and with it. Thus, this subject has been widely addressed considering not only the historical role of cities but also the problem that land-use change had caused throughout time ([2–6]). Still, the analysis of land-use change is generally associated to the impacts of growth, and to the implications it had on environmental, economic and social development dimensions ([7–12]). In fact, the environmental movement marked somehow by the publication of the book *Silent Spring* by Rachel Carson in 1962 may be considered a good example of this association, not only because Carson's book exposed the negative environmental impacts of land-use change considering the unchecked impact of industrial development both on natural ecosystems and human health, but also because the conversion of natural land into urbanized one started to be viewed as a possible threat to future of the planet.

This movement, which had a great impact in terms of land-use planning, gained a special momentum in 1969, the year of the first 'Earth Day', which revealed the environment to be a powerful political issue. It was the year of the formation of the U.S. Environmental Protection Agency (EPA), which enabled a wide range of laws to control existing and potential threats to the environment, thus affecting land use; and it was the publication year of the book *Design with Nature* by the landscape architect Ian McHarg, which according to Andresen [13] introduced the direct application of ecological principles in planning.

Since then, several steps were taken in order to mitigate land-use conflicts representing a response to different environmental paradigms. Still, according to Saraiva [14], since the beginning of the environmental movement, new concepts have emerged, including different variables into the existing models, enabling the creation of new environmental paradigms which may be divided in three phases (**Figure 1**): the first regarding *Environmental Protection* during the 60s and 70s—in which the imposition of limits to economic growth and to pollution were the main concern; the second regarding *Resource Management* during the 1970s and 1980s—considering the unmeasured consumption of natural resources; and the third during the 1980s and 1990s regarding *Sustainable Development*, and the need to consider social, economic and environmental aspects in development policies, taking into account environmental preservation in a way human needs can be met not only in the present but also for future generations.

These paradigms were and continue to be important steps in order to solve or reduce most of the land-use problems created during the last century.

Commoner ([15], cited by Lyle [16]) argues that the main problem lies in our means of production and that in order to solve environmental land-use problems, we need to change not only the location of certain activities but also the ways of making things. As it has been expressed, understanding this phenomenon is perhaps one of the most relevant consequences of assessing the history of land-use development (especially since industrial revolution), given that it becomes simpler not only to comprehend the current state of the art as it applies to us, but also to envision possible solutions for present and future problems ([17–21]; Loures [22]). In a period when cities have become places of diversity and contrast, of abundant wealth and abject poverty [47], of opportunity and threat [48], places where beauty and ugliness lie in close proximity and where the future collides with the past [23], it is increasingly necessary to understand its processes and the problems inherent to them, which are now substantially different from what they were in the beginning, and which are directly dependent on land-use change and evolution [24, 25], progressively moving from liner planning strategies to circular planning strategies (**Figure 2**) in which land use is defined considering not only present solutions but also landscape resilience, bearing in mind that imperatively, humanized landscapes are all transitional places.

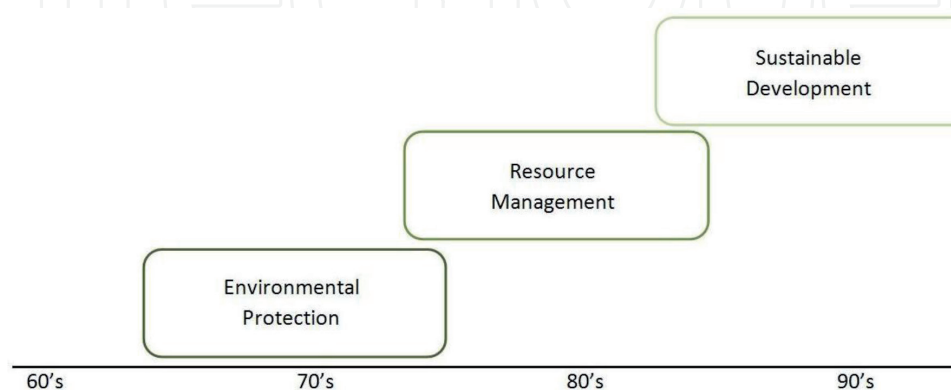


Figure 1. Evolution of the environmental paradigms. Source: Loures [10].

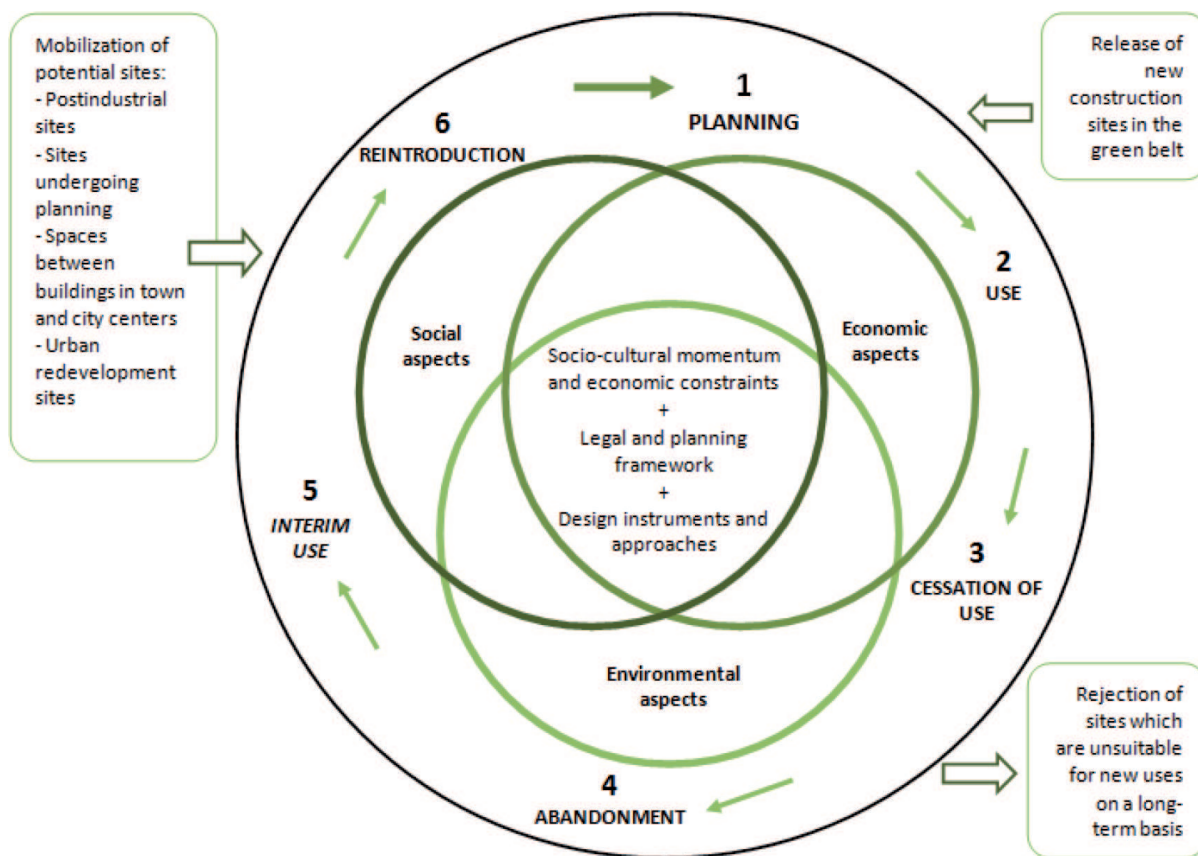


Figure 2. Circular land use management plan—Loures [10].

2. Sustainable land-use planning—from growth to development

It is a given that land-use change provides constant new opportunities for those who have the desire and the ability to seize landscape, regardless of their nature [21, 26–29]. In this regard, land-use change and planning are considered to be a significant resource for achieving sustainable development [30–33], contributing as well to improve life's quality. Nonetheless, it needs to be thought in terms of the town-nature reconnection, considering previously developed ecological and sustainability theories and principles. Indeed, future land-use planning needs to be redeveloped in an integrated multifunctional way, emphasizing the fact that envisioned planning alternatives should not only offer different multipurpose uses, in order to be more attractive and viable, but also incorporate sustainability (considering socio-cultural, economic and environmental and aesthetic dimensions) at various levels, from national and regional planning to individual construction sites.

Land use needs to be thought in terms of *sustainability* and/or *sustainable development*, terms that get used a lot these days, and which since their appearance have been faced as new development paradigms introduced in land-use matters, merging social, economic and environmental 'dimensions' [34], and putting nations to work together in the definition of new principles and frameworks towards sustainable development (Figure 3).



Figure 3 . Schematic overview of some conferences and publications regarding sustainable development issues. Source: Loures [10].

In this regard, the application of sustainability principles to land-use change and land-use planning, the concept of sustainable development suggests that growth must occur, but that it must be quality growth. Still, encouraging growth while reducing resource consumption, is according to North [35] in fundamental opposition. This idea, though acceptable, is arguably not totally correct, for example, under the scope of landscape redevelopment, is arguably not totally correct, once, while fostering growth, greyscale redevelopment (considered here as an alternative to greenfield development) reduces land consumption. Growth does not always have to mean 'new or more', the problem is that the relatively vague construction of the concept, depending on the context or purpose of its use, turned it into a kind of 'catch-all' term that now refers to almost anything [36].

Still, questions such as: How to achieve sustainability? How to measure it? And how does sustainable development improve current design and planning practices and *vice-versa*? continue to nourish the discussion around the concept of sustainability ([35, 37]; Manta-Conroy [38]), indicating that there is still a poor understanding of what it means [39], and of its influence in current landscape use and planning practices. This happens not only because sustainability may be interpreted in two ways: the first refers to landscape conservation, regarding the continuation of practices that maintain and organize it; the second, to the idea of perceiving sustainability as a main principle for future land use, considering the potential landscapes have to enhance sustainability [40], but also because the notion of a sustainable landscape development may involve a contradiction based on the fact that landscapes evolve somehow in a more or less chaotic way as a reflection of social and economic needs [40]. In this way, as mentioned by Potschin and Young ([41], p. 157) landscapes *may contribute to sustainability, but they are not sustainable in themselves*.

Considering this, at the planning level, the idea expressed by the Portuguese architect Nuno Portas [42] may represent in some way a vision of what planners and designers might

understand by sustainable land-use planning. According to Portas, in order to be sustainable, once we are living in a period of great uncertainties, planning and design decisions should be flexible, leaving space for possible amendments. He goes further and states: *for example, I am not thankful to Le Corbusier, by determining, in the beginning of the twentieth century, how modern cities should be. Today we know enough to say that the cities He envisioned were not good.* Sustainability land-use planning means in this way, the capacity to develop resilient landscapes, that is, landscapes with the capacity to absorb disturbance and reorganize while undergoing change so as to retain essentially the same function, structure, identity and feedbacks ([43, 44]), including also the capacity to recover from management mistakes.

These ideas are in some regard connected with the vision highlighted by the Dutch architects Rem Koolhaas and Adrian Geuze according to which planning and design should be faced as an opportunity to sketch out a future development without entirely fixing it [45], creating landscapes with the potential to change and evolve in accordance to still unknown usages. In fact, the integration of sustainability in planning and design processes represents a paradigm shift to the extent that it reflects not only changes in the manner in which development is planned, but also in the organization of the socio-cultural and economic mechanisms that control and implement planning, and in the role of the community in those land-use planning processes. This new reality enabled in part, by significant economic changes, led urban planning and design to another level, in which places and people acquired an increasing significance in economic redevelopment (**Figure 4**). Though, these efforts operate in contradiction to factors such as an increasing population, and a growing use of resources, many of them non-renewable [46].

Even if throughout recent years several normative theories regarding sustainable land use, considering both design and planning principles towards sustainable communities, were created, defining not only the ways in which land-use planning should be envisioned but also the ways in which new developments should be created, the answer to this question is far from being achieved. From an overall viewpoint, sustainable land use represents a subject of real sustainable dimensions, given that it tackles environmental, social and economic issues, which are the main dimensions of sustainability.

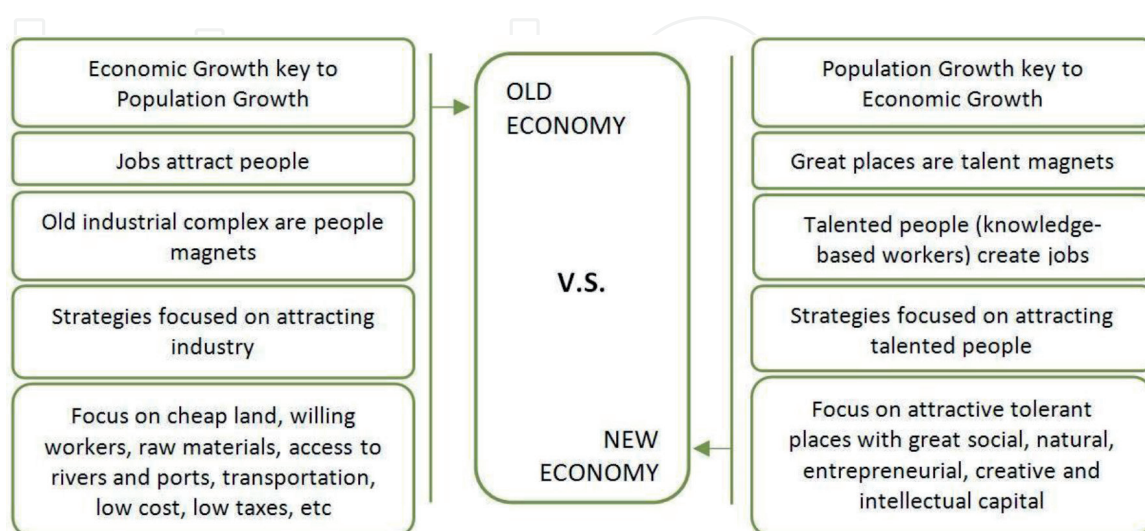


Figure 4 . Economic paradigm shift—old economy versus new economy. Source: Loures [10].

The present book considers a set of subjects which highlight the diverse nature of the scientific domains associated to land-use planning, emphasizing the need to acknowledge not only that environmental land use is not sufficient, but also that the contribution of each sustainability pillar is equally important, offering complementary development opportunities, while enabling landscapes to fulfil multiple functions in an integrated way, underlining the relevance of multifunctionality to promote sustainable land-use, planning strategies and policies.

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