Urban Growth and Sustainability. Case Study, Ribera Norte Project, Concepción, Chile

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Abstract. During the last decade of the past century, a new term emerges that extends and introduces all human activity, sustainability. Coined in the Rio Conference of 1992, it is defined by three stages: sustainable development is inscribed in the physical surroundings of habitat at all scales; it is, also, inscribed in time, in history: it ought to have permanence; lastly, sustainable development has to bring forth a new age of sustainable prosperity; that’s to say, transmissible, patrimonial. In this sense, sustainable development in urban environments is much broader than natural values, it is also conservation of inherited cultural patrimony and images that represent historical stages of industrial technique. Until the 2nd World Conference of Habitat in Istanbul, inside Agenda 21, the role of cities and local authorities are highlighted in the implementation of global environment compromises and the generation of better quality of life and habitat, emphasizing around two aspects: adequate housing and sustainable development of human settlings. The design, development and management of “sustainable human communities” qualified as urban quality of life, utilizing parameters based on an

1. Introduction
The last decade of the 20th century saw the emergence of a new term that extends and introduces all human activities, sustainability. Coined in the Rio Conference of 1992, it is defined by three stages: sustainable development is inscribed in the physical surroundings of habitat at all scales; it is, also, inscribed in time, in history: it ought to have permanence; lastly, sustainable development has to bring forth a new age of sustainable prosperity; that’s to say, transmissible, patrimonial. In this sense, sustainable development in urban environments is much broader than natural values, it is also conservation of inherited cultural patrimony and images that represent historical stages of industrial technique. Until the 2nd World Conference of Habitat in Istanbul, inside Agenda 21, the role of cities and local authorities are highlighted in the implementation of global environment compromises and the generation of better quality of life and habitat, emphasizing around two aspects: adequate housing and sustainable development of human settlings. The design, development and management of “sustainable human communities” qualified as urban quality of life, utilizing parameters based on an
integration between the environmental, the sociocultural, the aesthetic and the technologic, focused mainly on public space.

From then on, a series of schools of thought and disciplines inside urbanism that tackle the question of sustainability emerge sustainable urban design, eco urbanism, sustainable urban planning, ecological networks, among others that spread from technological innovation to constructed habitat. All of them seek to the construction of urban systems reasonably compact and complex, where housing are located in nearby places to the services that the city offers, walking distance accessibility, quick and of quality; contributing to the formation of a network of activities that ought to be localized in the lower plants of buildings -as an extension of the street-, extending the centre of the city and contributing to form a new place of reference, a new polarity. These different points of view seek territory as in constant transformation and with that, inevitable degrading of buildings and civil works, along with the obsolescence of any architectural construction. Likewise, excessive and unrestrained consumption of territory, modifying the balance between territory and city. Here we are interested in deepening in the new forms of controlling the effects of metropolitan extension and dilatation, one of them being urban revitalization. The term revitalization refers to life, evoking the action of breathing new life onto the exhausted urban tissue, going further than mere physical renovation. From this perspective, it is a concept that introduces or restores balance at the core of a damaged or defective urban ecosystem, demanding integral and systemic planning.

The last years of the 90s saw a process of true relaunching of cities, that, together with Agenda 21 and the new democratic governments, as in Chile, would generate studies and projects of urban intervention. One of them was the Program of Urban Recuperation of the Northern Ribera of the Biobio river (Programa de Recuperación Urbana de la Ribera Norte del río Biobío, project Ribera Norte from now on), in the cities of Concepción. In the present study we attempt to explore the relation and/or articulation between urban growth and urban sustainability through the mentioned urban revitalization project, assuming a three stage approach: first, a bibliographic and historical analysis (plans, reports, publications) that document and explain the project of Ribera Norte and its relation with the urban development of the city; second, an empirical and exploratory frame, constructed from the first analysis, that will seek to view the project from the perspective of sustainability; and lastly, show that these type of urban interventions not only act as physical renovation in an area of the city, but also, that they recuperate the balance between city and territory, what some authors call “recycle the city” [7]: constantly recuperate urban infrastructure, recognizing the capabilities of the existing city to transform and adapt to the new demands of the urban space and the profile of its users. And that they’re ought to be paired with clear policies and instruments of urban regulation, addressing the need to resolve the titanic problems of urban poverty and sustainability.

2. Ribera Norte and the City of Concepción

The city of Concepción is an urban area belonging to the AMC (Metropolitan Area of Concepción), localized in the Biobio region (8th region), 500km south of Santiago, Chile’s capital. It is the second most important urban concentration in the country, with a varied and important economic activity based primarily on industry: wood, fishing, mining and manufacture, among others. With a total area of 2.830,40 km2 and a population density upwards of 950.000 inhabitants (2012 census). It is a urban system that has experimented accelerated growth in a non-homogenous way over its territory, increasing the complexity of its urban structure with the incorporation of a number of urban centres, that in actuality function as a sole conurban system, being the central core of this system, the city of Concepción. Settled over a territory marked by the presence of bays; of rivers and estuaries, in particular the great hydrographic basin of the Biobío River; urban lagoons and a mountainous range of the Cordillera de la Costa. Natural elements that have exerted great influence in the definition and conduction of urbanization: process of settlement, configuration and growths of the distinctive urban cores that contribute to the metropolitan cluster.
Since its foundation as a martial city in the year 1550, in a place called “Pegno” at the edge of the bay area, it suffered war induced instability and natural event impacts, earthquake and tsunami alike, having to be relocated to its present placement in the Mocha valley due to the 1751 earthquake that put the city “temporarily buried by the sea”. The new location was placed to the interior, seeking to avoid the coast as much as possible, as a way to protect the city from new natural events, assuming the Biobío river as a limit or natural frontier for the city.

The city develops to the interior, occupying little valleys and the river would maintain its condition as limit – accorded as a condition of peace between the Spanish colony and the Mapuche, until independence in the 19th century. From then on, the first settlements emerge over the northern ribera: a project of canalization through artificial docks, and later with the arrival of the train and the construction of the first bridge over the river towards the end of the 19th century. With this new settlement flourish associated with train and industrial activity, together with a jail, giving the river a strong character of function and infrastructural importance rather than one of landscape importance.

During the 20th century, the city of Concepción again suffers the impact of natural events, each with its respective reconstructions that give a new structure to the city, regarding its form and urban image. Of these new landscapes, there’s the 1940 plan whose urban structure would be recovered in the Ribera Norte Project and; the 1965 Regulator Plan, which proposed the construction of a Capitol or Regional Government above the channel of the Bio Bio river, as a façade to city, for the first time establishing a relation between the city and the river, idea that never got to completion. The subsequent fillings done, at first by railroads and then with the rubble of the two earthquakes, modified the river margins, reducing the flow and allowing for occupation. The first viaducts are constructed (1942 and 1972) and the northern Ribera is reinforced against inundation and possible river floods with the building of a parapet between the two bridges. This functional relation of the city with the river as a infrastructural element, will be maintained towards the end of the 20th century and beginnings of the present one (Fig.2).

By then end of 90’s, the Christian Democratic governments push for new initiatives in urban development, one of them being the Northern Ribera Project of river Bio Bio (RN from now on). The
city had already trespassed the river, occupying and developing the south ribera with new residential settlements, that today constitute a whole metropolitan conurban system. In this context, the RN Project emerges as a response to the growing demand for high density residential urban soil near the city centre and, with this, being an alternative to the city peripheries. At the same time, it recognizes the river as a natural patrimonial element of structural significance to the city’s urban landscape and the whole metropolitan system of Concepción (Fig. 3).

![Figure 3. Urban recuperation of Bio Bio’s northern riverbank Program. Source: own elaboration based on MINVU 1994.](image)

In the present day, the RN project has been surpassed and has become a modelless territory [18]. According to Busquet [3] these are the risks of a “two speeds metropolization”, with central areas relegated and metropolitan peripheries in decay. Those ideas and hypothesis in the original project weren’t developed to completion and now it exhibits a polarized urban landscape, marked by huge transport infrastructure and bridges (2 in less than 600m), together with isolated municipal typologies, autonomous from each other; a public space of low quality and the near null heterogeneity of functions that characterizes the central urban tissues. Is it possible to consolidate urban growth, urban landscape and sustainability?

3. Ribera Norte and Urban Sustainability
The urban revitalization is a potential instrument and recourse to revert the effects of deterioration – physical, social and economic –of the centers of the city; it is the opportunity to recreate the urban conditions that the traditional centres demand for their sustainability. Despite this, it is a strategy that has receive little attention in the majority of countries of Centre and South America. The RN Project was an attempt to revitalize a degraded area of the city and incorporate one of the most significant natural geographic elements in the urban landscape of Concepción (Fig. 4).

![Figure 4. Ribera Norte, 1995 Source: MINVU](image)
The term revitalization refers to life, evoking the action of supplying new life to a given exhausted urban tissue, going beyond the mere physical renovation. From this perspective, it is an action that introduces or restores the balance at the core of a damaged or defective urban ecosystem, demanding integral and systemic planning. The area of intervention were low quality soils for the edification (successive formal and informal fillings), with problems of flooding, generating small artificial lagoons, that, in turn, constituted natural receptacles of rain water of the city, not having water disposal systems yet (Fig. 5). These are state owned lands, (Fig.6) that were occupied in heterogenous ways and by spontaneous settlements of social housing.

![Figure 5. Ribera Norte terrains, 1995. Source: MINVU](image)

As urban design, a project is conceived that addresses the physical transformation of 140 hectares and, the recuperation of the river landscape, in a balance between the city and the territory. The RN project defines a new urban structure, where urban pieces (5) are incorporated as idealized archetypes, setting up a mixed urban tissue, compact and complex of continuity to the pre-existing traditional setting. Singular buildings are proposed to support important public spaces (urban parks, green areas, avenues) (Fig. 7). Where the urban space is treated with depth of detail that enriches its uses, it’s what we call the “rationalization of the environment”. There was an attempt to consolidate and harmonize the pre-existent city through an operation that “base itself in the comprehension of the area of intervention’s vocation in the context of the city”. In an ordination based on “a system articulated of units, a set of elements, with interdependent positions and functions that auto regulate their functioning…” [15]. In a morphological reading of the city and the territory, that act as elements of social synthesis and with it, sustainability.
The Project attempted to “turn over” the internal structure of the city, turning the development of the areas of greater value towards the coast and, with this, weaken the presence of the railroads. A new hypothesis of urban development: the city with a new front, a way of recreative and leisure waterfront (Fig. 8). All these ideas are translated to a plan, normative regulatory instrument that allows for the development of proposed design. However, this instrument constitutes the principal impediment for the implementation of the project’s ideas and hypothesis. For its setting, it modifies the defined urban pieces, centring its priorities in private space over open public spaces (Fig. 9).
The normative was modified at least three times, revealing, for one, a clear corporate option, towards satisfying private interests. On the other hand, a state management marked by the point of view of the government in turn, that faced with any demand for urban soil by social or institutional entities, they made use of unoccupied lands of the northern ribera for the installation of future public infrastructure works (bridges, investigations headquarters, social housing, among others). According to Bentley et al. [1], the tragedy of modern design consists in that those who produce projects never have realize a unified effort to find the formal implications of their political and social ideals. The authentic strength of the compromised attitude with these ideals appears to have given way to the conclusion that the preoccupation for form in itself was, in a sense, superficial.

4. Conclusions
The Northern Ribera Project was one of the most ambitious urban interventions in the country, both in terms of the public administration and of sustainable urban development and, represents a very good material for analysis and reflection about the physical transformation of our cities from the perspective of urban sustainability: inquire about the permanence and changes of structures, supports and urban forms. More when in the past few years, this process of permanent transformation has led to excessive and unrestrained consumption of the territory.

The city is a constant state of mutation and the recuperation of degraded areas is great opportunity for sustainable urban development, recuperating urban infrastructure to not consume more soil. In this sense the RN Project looked for a model of urban concentration, recognizing the capacities of the existing city to transform and adapt to the new demands for space and of the profile of its users. In its proposal we can see concepts proper of urban sustainability: compactness (building density, space use distribution, green space percentages. Determines the proximity between urban uses and functions); complexity (urban organization, the degree of mixture between uses and functions implemented in a given territory); efficacy (urban metabolism, that’s to say, material flows, water and energy) and; stability (cohesion and social mixture). The urban form its projected with the definition of determined proportions, distances, cardinal orientations or scales, given that they help to set paths of its function. Capital components of an urban space conceived for sustainable life.

However, this didn’t happen. This was in great part to an almost nonexistent technical capacity to tackle the task of this kind of project and, even more conclusively, the lack of clear public policy to address sustainable urban development. Good urban design is not enough if city governance – the “structures of command”: political conditions of planification, actors and participants; not considering sustainable development of the project, a systemic foundation of public policy, a style of acting with an integral vision, and not simply as concept or slogan. The city has an important role in the construction of a sustainable future, given that it is its space per excellence, for the implementation of said public policies, founded in a project of economic growth that includes as activating strategies competition and is based in principle of sustainability (environmental and social) [2].

Finally, adding that the accumulation logic contradicts the logic of sustainability. In a Subsidiary State, as that of Chile, urban sustainability becomes practically inviable.

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