

Territorial Model for the Management of Riverfront Areas as Public Spaces in Cities with Historical Centers of Monumental Value. The case of Arequipa, Peru

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Abstract: This paper discusses the proposal of a model for the management of riverfront areas as public spaces in cities with historic centers of monumental value, taking as a case study the Chili River in Arequipa, Peru. The study proposes a model of territorial analysis and a methodological approach that allows to understand the way in which the riverscape, as a territory, is conceived, used and managed. The theoretical framework on which the model is based is the conception of the city as a system of interfaces in which the river basin and the public space coexist and interact. The methodological strategy is mixed, starting from a documentary review, the analysis of interfaces and the field visit to several initiatives in Latin American cities which have developed or are in the process of developing riverfront recovery projects in areas of historical, landscape or physical-spatial value. From a more specific point of view, it was possible to deepen in the analysis of urban heritage, the functions and relations of the institutions that intervene in the management of the watersheds; as well as to know the social and cultural characteristics of the inhabitants that interact in these areas. From this basis, we propose guidelines that contribute to enhance the river's identity and formulate criteria for the incorporation of public space in riverfront urban areas of monumental historical value. Finally, various models of management are proposed in order to suggest the development and sustainability of these strategies.

1. Introduction

There are several experiences of cities worldwide that have incorporated their rivers in their urban design practices. In several cities, this has been achieved by means of the incorporation of the strategy well known as “waterfront development” (Blanes-González, 2013) that accounts for the development of a city in the face of water resources (Dirk, 2014). However, in most cities in Latin America, rivers experience abandonment and environmental deterioration, with several negative effects, that include social, economic, cultural and environmental issues.

This problem is caused by several reasons, such as the increase in urban pressure around the river, due to an accelerated process of demographic growth of the cities, and consequently, of an urban expansion characterized by its low density, resulting in an increase in tertiary activities in the central areas and the displacement of housing towards the periphery. In the same way, the

appearance of industrial uses contiguous to the rivers due to the availability of water, a practice that was very common from the mid-20th century, has led to environmental deterioration with direct repercussions on the water tributaries, as well as a negative effect in the surrounding areas, causing social problems such as crime rise or lack of development. Decrease in the economic value is also common in these abandoned areas, as well as their surrounding neighborhoods, and this has had an effect on the preservation of heritage as well, very important in historical Latin American cities, accompanied by the lack of exploitation of the tourist potential of these areas. In short, in many cases the physical, environmental and social deterioration of the urban areas around rivers, and the discharge of waste resulting from production or consumption processes has been evident.

The aforementioned context allows us to question the role that urban planners and decision makers have had in Latin American cities, as their actions and decisions materialized in regulations, given to the riverfronts areas as public spaces of cities that have patrimonial value. As seen in different Latin American cities, the lack of economic resources pushes a prioritization of public spending towards more urgent needs, although not less important, that differ from the environmental management of rivers.

In any case, the lack of physical and social accessibility to the river, the detachment of the cities from their environment and the disappearance of important heritage around the riverfront, impact on its potential as democratic scenarios that could contribute to improving life in public.

2. The Contrast

In spite of the aforementioned problems, a historical perspective can give evidence of a different panorama, in which the cities recognized the value of their rivers. Several cities that were founded around these, knew how to enjoy a harmonious life with the rivers, since these were the source of water supply for human consumption and irrigation of crops, and even, in some cultures, water bodies were considered as deities. Orchards, parks or promenades were located along the banks, and in some cases, according to the characteristics of the river, they allowed communication and navigation between towns. The environmental impacts of domestic waste were minimal or, in any case, were absorbed by the carrying capacity of the river. These scenarios changed due to the growth, in many occasions unplanned, as well as the economic and industrial dynamics, typical of the modern city. By not having management and planning tools, cities failed to recognize the potential that their rivers could provide (Correa-Orozco & Cohen-Cárdenas, 2019). However, there are some good practices in Latin America that could serve as a model for the improvement of an urban life, taking advantage of the characteristics of rivers as natural ecosystems that could attract both natural and social life around their shores.

These thoughts have been considered by the “Public Space for Social-educational Urban Transformation: Library Parks in Arequipa for an Intercultural and Inclusive City” research project, which has proposed a system in which the Chili River could become a space for the integration of the community, preserving its historical and landscape character that were identified when it was declared a World Heritage Site by UNESCO, along with the Historical Center of Arequipa, Peru.

From this context, this paper discusses an analysis that aims to contribute to urban design practices, by giving an account of what has happened in some Latin American experiences and then propose a method to link the river to the city as a public space. From this approach, it is necessary to know its effects in improving the quality of life of the community.

3. The Management of Rivers as a Public Space

The spatial approach to planning, spatial management and the definition of policies allow a perception of the riverscape in detail (Forman, 1997). This spatial approach considers four elements:

- in each landscape is required the presence of few but large groups of natural vegetation, in order to protect the richness of the species in this landscape;
- in each landscape, long vegetation corridors, and mainly rivers, provide an exceptionally wide range of ecological benefits. These include the control of erosion and river flooding, the reduction of the dumping of harmful substances in the course of water, the favorable predisposition for the habitat of the ichthyofauna and, finally, the protection of the movements of the fauna throughout the fluvial system;
- the connection between groups of vegetation, by grouping small spots of green area, is the key that allows the movement of the species through them;
- in each territory, these small portions or corridors of vegetation, provides many ecological benefits, such as the protection of diffuse species, reduce the volume of wind and reduce the phenomena of water and wind erosion.

However, the management of urban basins not only takes into account the landscape aspect but also concerted management, assuming a responsible vision that covers economic, environmental and risk management, such as flood control, for example. From a vision that assumes riverfronts as areas that host public spaces, urban planning and management should deal with the construction and implementation of legal instruments and tools that promote, regulate and control what happens in those spaces. From this approach, it is understood that the management materializes in institutional regulations.

These regulations give an account of rules that regulate spaces in general. A theoretical analysis of the rule located in a spatial dimension (Burbano, 2009) admits that it can condition the uses of spaces and the social practices that are sustained in them, therefore, influencing the appropriation of the riverfronts by the community, assuming that the water tributaries are producers of public space and intervene in the generation of territory. This approach admits analyzing that not all the rules are regulated, these can result from the action and the use that people give to the spaces, so it is important to take into account the role of the community uses the riverfronts. From this orientation, the water system is considered fundamental for the study of territoriality (Puello-Bedoya, 2005).

4. Methods

The methodology of the present research is a documentary exploration, which includes sources from scientific and technical literature. To this end, we sought experiences from South American cities that have recovered, are in process or have developed river recovery projects in urban basins, especially in areas of historical, monumental, or landscape value.

The cases described have been verified through a field visit to each of the cities and countries, through on-site information gathering and interviews with the main stakeholders of the urban waterfront management processes, as well as the population in general.

Later a comparative matrix of these cases has been elaborated, including the main social, environmental, physical spatial and institutional management aspects concerning the riverfront fronts.

Finally, an integrated diagnosis was proposed for the Chili River.

5. The case of the Chili River, Arequipa, Peru

Skilled prehispanic settlers transformed the most arid desert in the world into the fertile valley of the Chili River, through a complex system of terraces and canals. This spectacular agricultural landscape was chosen by the Spanish conquerors who, from 1540, built the city of Arequipa using a white volcanic stone, and building some of the most important architectural gems of the Latin American mestizo baroque. Both components, the river and the historic city were declared a UNESCO World Heritage Site (2000).

The interest in developing public spaces next to the river dates from the beginning of the 20th century, when the Bolognesi Alameda was developed, a magnificent promenade with trees which overlooks the valley. Later, in 1940, during the fourth centennial of the city, the Selva Alegre metropolitan park was developed on the other side of the river, over an area of 20 hectares, that is, 20 times more than the Plaza de Armas (Main Square) of the colonial city (Zeballos, 2007). A study carried out by the AQParq Project identifies this area as the most important recreational space in the city.

With modernity, the waters of the river began to be polluted, until becoming one of the most contaminated rivers in Peru (RPP, 2011). Industrial pollution by tanneries, contamination of agricultural land, discharge of drains and solid waste, air pollution, etc. was added to the loss of greenery and agricultural areas and to the exponential population increase, which caused a continuous process of environmental deterioration in the river and its surroundings (Zeballos, Modelo de Plan de Gestión para la Recuperación Ambiental de Franjas Ribereñas en Zonas Urbano Monumentales: El Caso del Valle del Río Chili en Arequipa, Perú. Master thesis., 2002).

However, in recent years significant progress has been made in improving water quality, thanks to the construction of a wastewater treatment plant in 2016, which treats and purifies wastewater before discharge it back into the river water. This, together with the constant environmental monitoring on the part of municipal and regional authorities, has reduced the contamination of the river considerably, although there are still some sources of contamination along the course (Zeballos, 2019).

From the point of view of urban planning, the City Master Plan has considered the riverfront area as a landscape reserve, although a specific plan has not yet been developed to regulate it (IMPLA, 2016).

Within this regulated area the creation of the so-called “Parque de las Rocas” (Rocky Park) in the district of Alto Selva Alegre, has been proposed a desert ecosystem rich in flora and fauna that was presented as an area protected by the National Congress (Congreso de la República del Perú, 2019). However, there are interests of the electricity company to install a power plant and a dam in the middle of an ecological reserve. This initiative has been approved in Lima for interests outside the city and has the rejection of the professional associations and the municipality itself.

For this reason and for the tremendous urban pressure these areas endure, it is urgent to develop a Specific Plan for the Chili River that preserves the landscape heritage of the basin. This plan should encourage the protection of the river countryside as a landscape zone while promoting the development of urban parks in the area in contact with the monumental city center, stimulating social access of the community to the riverfront, particularly in the areas of monumental value (Figure 1).

Also, important projects for the recovery of monumental heritage and social upgrade have been carried out in the so-called *tambos*, which are places built during colonial times where

people used to live in poor conditions and they were renovated keeping in mind the needs and social networks of these communities.

6. Results from study cases in South America

From a broad view, it has been possible to account for initiatives in South America that seek to recover the environmental deterioration of the urban riverfronts, some of them, which have contact with monumental areas. Field visits to other cities in Peru, Paraguay, Argentina, Brasil, Uruguay and Chile, have showed several experiences in the case of urban environmental management in riverfronts, everyone of them with some particular strengths.

It is not the purpose of this paper to carry out a comparative study between these different Latin American experiences, which are also quite heterogeneous. It is, rather, to know the an-



Figure 1. Chili River next to the monumental area of Arequipa.

swers or patterns of solution that those practices involved in order to solve the problems that concern the relevant aspects in the management of urban basins.

For this reason, the following table summarizes the main variables, the relevant problems found in the rivers and the patterns of solution assumed by the different experiences cited.

7. Discussion: the Territorial Diagnosis

By means of the participation of the institutions and of the population itself, through workshops, it was possible to identify areas of homogeneous behavior, recognizing the most important problems that affect the development of the basin and spatially locate them.

Four subsystems of analysis, were defined, which are closely interrelated. These are:

Table 1.

VARIABLE	PROBLEM	SOLUTION	EXAMPLE
Monumental And Physical Space Value	Deterioration of built heritage	Restoration of monumental areas or buildings	- Parana Park - Puerto Madero
	Lack of spatial relation between the city and the river	Creation, habilitation or recovery of metropolitan open spaces for social use	- Mapocho Park, Santiago
	Existence of vacant spaces, abandoned buildings and incompatible uses		- Rimac Park - Tambos around the Chili River
	Location of slums around the river	Creation of low-income housing programs, with adequate services and public spaces for interaction with the river,	- Coastal Strip, Paraguay - Lombas do Pinheiro, - Tambos around the Chili River
Economic Productivity	Deterioration of heritage. Social and economic marginality	Recovery of areas of landscape and cultural value.	- Puerto Madero - Coastal Strip, Paraguay
	Lack of means to execute projects of social and environmental interest	Enabling land for tourist use near the river, to finance social housing and recreation spaces	- Coastal Strip, Paraguay
Environmental Quality	Contamination of water, by domestic and industrial or by solid waste	Provision of infrastructure and treatment plants to reduce the emissions.	- Mapocho park - Chili River treatment plant
	Homes located in flood risk areas	Protection of the riverbanks and relocation	- Coastal Strip, Paraguay
Inter-Institutional Management	Lack of knowledge of the citizenship of the management initiatives	Communication strategies to involve public opinion	- Arroyo Miguelete, Uruguay

- Natural Subsystem: that studies how ecosystems were affected, such as the urban pressure on agricultural areas around the river, the presence of natural ecotones and their deterioration or contamination, and the degrees of environmental risk.
- Economic Subsystem: which shows the quantity and quality of activities in the sector, through an analysis of land use, and exposes the potential tourist attractiveness of the sector.
- Socio-Cultural Subsystem: which indicates the scarce amount of public spaces facing the river, as well as the important presence of monuments in the study area. In addition, it shows the presence of public and private institutions, committed to the development of the city, located in this area.
- Physical-Spatial Subsystem: that analyzes the characteristics of urban space, indicating its quality of conservation, what areas are deteriorated, what the physical public accessibility to the river is and how natural and constructed edges are formed.

The description of these subsystems, their conflicts and potentialities as well as their aptitudes (patterns of solution) establish a real framework of the situation in the study area and are the basis for proposing management models. The proposed management model takes as a reference the real situation of the study area, based on the Integrated Territorial Diagnosis and is framed within the local rules and regulations.

The management model will start from the interfaces and solution patterns defined in the integrated diagnosis, to promote a set of actions, programs and projects that aim to contribute to the environmental recovery of the Chili riverfront in monumental areas. On the other hand, the political administrative actions that take place in the metropolitan basin by the various institutions must be channeled through management actions that strengthen them, give them continuity, encourage inter-institutional participation and allow them to be flexible before possible changes in the social or political context.

From the integrated diagnosis, important driving forces or “central ideas” for the Chili river basin are also developed. A central idea is a future vision of a territory and to which the policies, fields of action and programs or projects to be carried out ultimately lead. A central idea is also a communicational element, open and appropriable by the population, so that it can provide identification and social and institutional support to a specific program that allows it to be rooted in the collective memory of the population.

8. Conclusions

- There are initiatives in South America that had led to the recovering of the environmental deterioration of the urban basins of its rivers near to monumental area, with different degrees of success and strengths.
- In order to achieve this objective, they have formed multisectoral entities that, along with citizen participation, propose, execute and supervise environmental projects for the improvement of these areas. They have also developed programs of restoration and / or renovation of buildings of heritage value, and have provided spaces for social and public exchange, improving living conditions.
- Although, for economic reasons, the decontamination process of the rivers is slow, pro-

gress has been made, involving both the local population and international cooperation for that purpose.

- In the mentioned cases, there has been an increase in the value of land adjacent to recovered riverfronts, as well as the increase and development of economic activities related to tourism and recreation, showing the potential of these areas as recreational and tourist attraction areas, economically revitalizing them, and renewing the identity of the inhabitants with their rivers.
- In the Chili River area that is in contact with the Historic Center, there are numerous sources of contamination, both hydric and atmospheric and solid waste. However, pollution levels are not irreversible and providing infrastructure and control measures would achieve environmental cleanup.
- The study area houses the largest quantity and quality of historical monuments in Arequipa, as well as a strong link between the built historical heritage of Arequipa with the natural landscape legacy of the Chili River, as two indissoluble components of a landscape of universal value.
- The lack of spaces for social exchange in the Historical Center and the Chili River has produced a gradual loss of identity of the local inhabitant with his river. However, there are areas feasible to be converted into public parks near the river.
- The high density of institutions located in the study area that would be of interest and would support a Chili recovery program can be an important factor in the process of riverfront development, if mechanisms are established that articulate efforts under the guideline of a coordinated and participatory Management Plan, and if it is that the population is involved in order to socially legitimize it.

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