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Transformation of Urban Life with Urban Water; Natural Waterscape to Technological Water Management System for the City of São Paulo, Brazil

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ABSTRACT

São Paulo, Brazil is ranked in peak inventory for the aggressively urban growth and known as most populous city in the southern hemisphere. Urban water manner is usually indication of the heritage, culture, economy and political issues of a city. The formation of São Paulo can be identified by the presence of large rivers, it was called 'water city' once. But with the response of climatic issues, the rivers lost its natural flow due to rectification and canalization having hard and extensive infrastructural boundaries on both banks, isolating correlation between the river and the city. Almost, the whole water system runs under the ground surface at present. With the water system the social and cultural activities of city dwellers changed through time. Once the city of water is now facing its back towards the water and the rivers are nothing but lifeless infrastructural elements. This paper investigates the transformation of urban life with the transformation of rivers and possibilities of bringing back the life of water for the city dwellers enhancing the cultural heritage of the city. Research question: • How urban life and urban water is co related for the city of São Paulo? • How technologically improvised urban water system can be linked with the city and urban people by improving the environmental factors?

Keywords: Urban Water; Urban Life; Identity of city; Culture; Technology

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TRANSFORMATION OF URBAN LIFE WITH URBAN WATER; NATURAL WATERSCAPE TO TECHNOLOGICAL WATER MANAGEMENT SYSTEM FOR THE CITY OF SÃO PAULO, BRAZIL.

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Abstract

São Paulo, Brazil is ranked in peak inventory for the aggressively urban growth and known as most populous city in the southern hemisphere. Urban water manner is usually indication of the heritage, culture, economy and political issues of a city. The formation of São Paulo can be identified by the presence of large rivers, it was called 'water city' once. But with the response of climatic issues, the rivers lost its natural flow due to rectification and canalization having hard and extensive infrastructural boundaries on both banks, isolating correlation between the river and the city. Almost, the whole water system runs under the ground surface at present. With the water system the social and cultural activities of city dwellers changed through time. Once the city of water is now facing its back towards the water and the rivers are nothing but lifeless infrastructural elements. This paper investigates the transformation of urban life with the transformation of rivers and possibilities of bringing back the life of water for the city dwellers enhancing the cultural heritage of the city.

Research question:

- *How urban life and urban water is co related for the city of São Paulo?*
- *How technologically improvised urban water system can be linked with the city and urban people by improving the environmental factors?*

Keywords: *Urban Water, Urban Life, Identity of city, Culture, Technology.*

1. Introduction

São Paulo is the largest city in the Americas by population and the place of culture, commerce, finance and arts. The location of the city is in the terrain of two main rivers, its floodplains and tributaries. Therefore, the relation of water with the city is proximate. The country uses its river as a vital source of producing hydropower and transportation as well. From the foundation of São Paulo, the regular activities of city dwellers were centralized by water, but currently, the scenario of urban life is opposite. The connection with water and people is lost due to rapid urbanization and road-based urbanism. The strong infrastructural system has created the barrier between river and city, thus the river has become the leftover part of the city which can hardly be seen and felt except during the flood time. This research paper concentrates on the new possibilities of integrating segregated rivers with the city again and revives the history and culture of the city inventing lost public

spaces for the city dwellers. The aggressive urbanization has grown without considering the urban water, where both can collectively perform for balanced urban life.

2. Research Methods

This research presented in the paper was possible by making a field trip to the city of São Paulo for two weeks. Having the opportunity to explore the site by public and private transportation system and taking pictures, interviewing city dwellers on site gave clear idea of the situation. This practical experience along with readers, articles, books, papers, searching in local libraries assisted to prepare the analysis and findings of this research.

The structure and analysis of the paper has been made in two parts. The first part of the research focuses on the shape of the city and conditions of the Tietê River basin. The water system of these rivers and urban areas are investigated. The historic evolution of urban expansion along with

water system is particularly focused in this part. In the second part of the paper, design strategies and proposals are defined. Solutions to connect segregated water with the city and city people are explored by adding ecological features by the river basins. Finally reviving the waterscape enhancing the culture and bringing back life to the lifeless rivers are concerned. Different mapping are used to interpret the design strategies.

3. Historical evolution and Urban growth of the city São Paulo

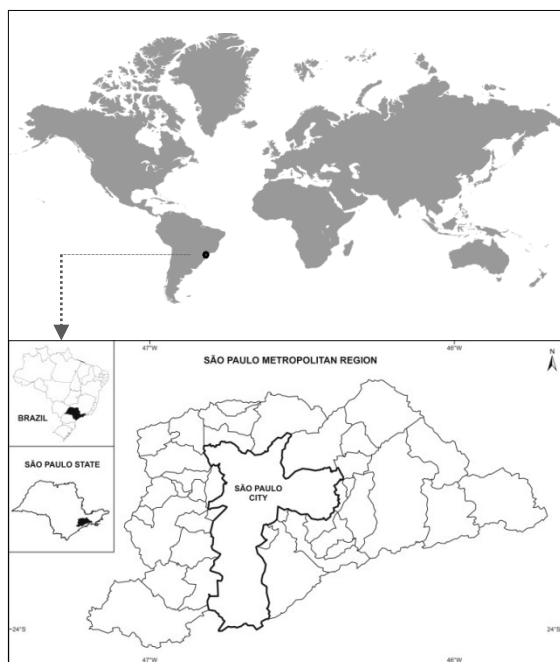


Figure1. Location of São Paulo

[Source: www.sciencedirect.com]

São Paulo, the city of southeastern Brazil has been ranked as the 12th largest city according to the population of the world. Being the nucleus of culture and economy, the metropolitan region of São Paulo is the grouping of 39 municipalities with 21.1 million of inhabitants (2014 National Census). The city of São Paulo is the largest among them. After the political independence in 1822, the city faced foremost changes. Before this the first 300 years were not so significant, it was just the administrative symbol of colonial government.

The coffee was launched to Brazil in 1727 and became a strong component of the Brazilian economy. São Paulo turned to the center for coffee commerce in the nineteenth century. This was a major attraction for foreign immigrants seeking work. The city became most multicultural due to various immigrants from Italians, Germans, Greeks, Japanese, Arabs, Chinese and Koreans. This enhanced the cultural value of the city. Water has been a part of the culture for these multidimensional cultural aspects. Activities centering water of the city was a very common phenomenon.

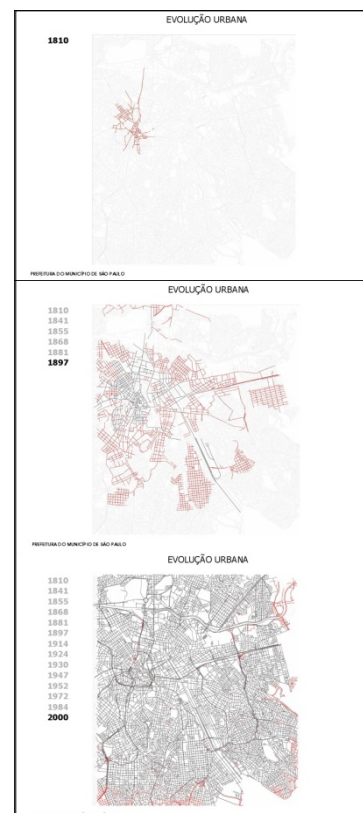


Figure2. Urban Growth of São Paulo during the year of 1810, 1897 and 2000.

[Source: The municipal of São Paulo]

For industrial and commercial purpose as well as for leisure activities, relation with water and city people was incredibly strong and habitual.

The climate of the region is always not favorable for the urban water management and usage. This monsoon-influenced humid subtropical climate go through

plenty rainfall every year (1,454 millimeters on average). The Metropolitan Region of São Paulo is having more precipitation and tremendous rainfall even in winter due to global climate change. Before the 1950s the crest of 50mm of precipitation was never seen but now it occurs two to five times every year. The magnificent locale of São Paulo consists of 7490 km² hills, deep valleys and slopes which floods with the heavy rainfall during summer.

The Brazilian architecture reached its radical moment at the end of the 1960s. After a decade of the inauguration of Brasília, the center of national architectural invention moved from Rio de Janeiro to São Paulo. São Paulo became rich in architecture as well. The buildings of São Paulo had to adapt with the growing chaotic urban flow. The urban design and pattern of the city also evolved with the rapid urbanization. With the urban growth, the infrastructural pattern developed and accommodated population (fig 2). With the construction of new railroads in 1930, the first industrial developments started to concentrate surrounding the railroads. The mobility increased and industrial expansion took place after this.

4. Urban life and Urban water for the city of São Paulo

The rivers and its tributaries, streams, creeks are now running under the city of São Paulo. These were cloaked underground and canalized to reduce the overflow of water during rainy season and hold the rapid urbanization. The relationships between São Paulo city and its water can be divided into three major periods. [1]

4.1. History of Water and city

1st period (16th century-19th century)

Key geographical feature in the São Paulo's urban core was the natural waterscape. The natural waterscape was incorporated into daily life as both ran simultaneously. Rivers were part of life

and integrated with daily activities. It played a fundamental task for transportation and communication scheme. Various athletic activities like 'rowing' clubs were very popular during early 20th century; it was part of the culture of the city.



Figure3. The Tietê River retraced from an old postcard showing the natural waterscape.

[Source: wikiwand.com]

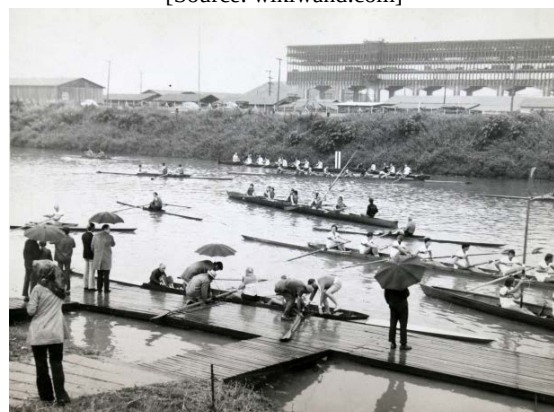


Figure4. Daily activities along the Tietê River

[Source: sao-paulo.estadao.com.br]

Fishing and sports activities and nautical races on the river were very famous during the 1920s and 1930s. Boat race clubs were established in this period, few of them still exist now but lost its charm.



Figure5. The athletic activities along the Tietê River

[Source: sao-paulo.estadao.com.br]

2nd period (From 1850 and 1930)

The technological development influenced the relationships between city and people. To meet the need of water in everyday life and to supply the water to home changed the natural water flow of the city as well. The piping system occurred and sources were placed far away from the city. The natural fountains disappeared day by day and the rivers lost its charm and became a barrier for the city people. Activities centering the river lessened due to hard marginal. Large companies came to build these infrastructural barriers and introduced new technologies. Global capitalism and land acquiring tendencies were also a major factor in this change.

3rd period (1930 to now)

The aggressive urban growth was noticed during this time and still going on the city occupied its own floodplain areas. The marginal and avenues along the river were prominent and cityscape, landscape and waterscape changed after this. The main river was segregated from the city by the strong infrastructural barrier and the tributaries became the branches of traffic, the main water system run under the city. These technologies for infrastructure shaped the form of present São Paulo and spoiled the water resources and connectivity with water and the city. The electricity transmission poles and the railroad are established along the rivers as landscape elements making it more artificial.

4.2. Present condition of Water and city



Figure6. The Tietê River segregated by

strong infrastructural barrier having no physical connection with urban people.

[Photograph by author]

Most of the water bodies lost its life and was hidden permanently under concrete by 1960. The urban growth process and the technological intervention of the city destroyed the water resources and the Tietê River, the Pinheiros River and the Tamanduateí River became polluted by the sewers of the city. Even in 1960s, the Tietê had fishes but due to environmental degradation and construction of the reservoir, tramway, Power Company, hydroelectric power stations killed the river later. Swimming, water sports, rowing and other athletic activities and leisure time spend of urban people came to an end. The city has fully occupied the bank of the rivers where the village of São Paulo of Piratininga was founded once.



Figure7. Pollution of water bodies in São Paulo (present condition)

[Photograph by author]

5. The Alto-Tietê Basin

The Tietê is the main river of the city of and it was named on the map of 1748 indicating the meaning ‘The truthful river’. This river runs throughout the metropolitan area of São Paulo and runs 1,136 kilometers in the São Paulo state marking as the north boundary of the city and a desired country destination for the Paulista culture. It runs beside the express highway named Marginal Tietê within the city. In 1907 and 1929 Guarapiranga and Billings Reservoirs were constructed for power generation. Traição and Pedreira pumping plants dominated the landscape along the

Tietê River basin and its tributaries which helped to make the river completely non-natural and extremely polluted. During the 1970s a State Environmental Agency CETESB was created and first wastewater

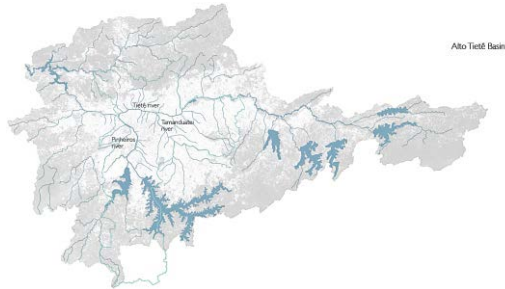


Figure8. The Alto-Tietê River Basin

collection and treatment were built to serve the city. The Alto-Tietê Basin Committee was formed in 1994 and numerous initiatives are taken to improve the water system for the city. The river is biologically dead. [ii]

6. Proposals to revitalize the rivers and the city

6.1. Physical connectivity with urban water and urban people

The segregation of the Tietê River is basically guided by the hard infrastructure including highway and railroads. For this reason the river is inaccessible for the people of the city. The banks (left and right) of the river are a solid concrete surface with no access to the pedestrian.



Figure9. Proposed wetland construction as public space and promoting activities

It would be difficult to change the infrastructural layout quickly but connecting the banks with bridge and promoting activities on the river banks can connect the people with water. The pedestrian walkway and bike path can be designed along the banks connecting with the other side by pedestrian-friendly over bridge will influence the mobility flow towards the water and people will be able to enjoy the nature.

6.2. Environmental contribution

To improve the water quality, a constructed wetland can play a vital role and treat water in a natural process. Wetland vegetation, soil and organisms purify the water by working as a biofilter. Subsurface or hybrid wetlands are an environmental friendly concept to improve water condition. These wetlands can be designed in consideration with contemporary waterscape and artificial ecologies will increase the environmental impact of the city without de-canalization of the river. These wetlands can be used as public spaces and bring people closer to the river. There are few tributaries of the Tietê River still uncovered, preserving those are essential at this time. This will also have a positive impact in solving the flood problem.

along the Tietê River and its tributaries.

[By author]

6.3. Reviving the culture

The history of São Paulo demonstrates how water was an integrated part of daily life. The culture, heritage and leisure activities of life were related which can be introduced in urban life too. Due to urbanization and water management up gradation, the water cultural co-relation has come to an end. Recreating water activities will revive the history of São Paulo's culture and heritage. The accessible water having activities will influence the city people to have their leisure and experience the earlier period again. The lack of cityscape can also be revived by providing public spaces like urban balconies in the interval of walkways, urban parks along the river bank, urban gardens which will give the city dwellers an opportunity to sense the presence of the river once again. Boat clubs can come to its role once again akin to the past.

7. Conclusions

The balanced restoration between urban water and urban life is a necessity for the city of São Paulo. The city having rapid urbanization and aggressive urban growth, a new paradigm in city and water must commence. By rearranging the urban tissue and infrastructure, integration of the water with the city can provide public spaces for urban people. The city of São Paulo will gain the lost tales and revive the cultural meaning and use of urban water with the growing urbanism. The research presented in the paper focuses strongly on the rivers standing as a marginal for the city. The land use pattern and urban tissue can be re-programmed considering the relation with urban life and urban water. This will certainly bring positivism in the culture of São Paulo, reviving the past. The city of water may not turn again as a water city, but definitely, it may turn to a city having proximity with water.

8. References

- [1] Wisnik, G. (2012). Public Space on the Run. *Third Text* , 117-129.
- [2] KAHTOUNI, S. SÃO PAULO, A WATER CITY. São Paulo – SP: Rua Ministro de Godoi.
- [3] Shannon, K. (2016). Landscape Urbanism Reader of KU Leuven MaHS program.
- [4] <https://www.thoughtco.com/the-history-of-sao-paulo-2136590>
- [5] <http://saopaulo.estadao.com.br/noticias/geral,rio-mais-poluido-do-pais-tiete-e-tambem-o-mais-rico-e-populoso-imp-,1077411>
- [6] http://www.wikiwand.com/en/Tiet%C3%AA_River#/Pollution_and_environmental_degradation
- [7] http://www.wikiwand.com/en/Water_management_in_the_Metropolitan_Region_of_S%C3%A3o_Paulo
- [8] Mathur, A., Cunha, D. D., & Mathur, A. (2014). *Design in the terrain of water*. United States: Applied Research Design Publishing.

ⁱ KAHTOUNI, S. SÃO PAULO, A WATER CITY. São Paulo – SP: Rua Ministro de Godoi.

ⁱⁱ http://www.wikiwand.com/en/Water_management_in_the_Metropolitan_Region_of_S%C3%A3o_Paulo