Conservation of tropical peatlands and regeneration of Banjarese urban areas: A case study of town planning in the Central and South Kalimantan

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Abstract. The Central Kalimantan has demanded to be separated from South Kalimantan during the 1950s due to the struggle of the Dayaks movement on the historical claim over their resources and territories. This separation also changed the system of characteristics of the way of living in and around indigenous Banjarese and Dayaks particularly in coastal urban areas while some parts of historical districts have still remained. Exploitation through deforestation, drainage, and human settlements along the coastal zones has created vast areas of degraded wetlands. This paper discusses the relations between action plan projects of tourism municipal government and needs alternative land use options for upgrading the wetland environment in the context of urban regeneration and reducing of CO2 emission. The simulation of fifteen fundamental properties model shows that the characteristic nature both South and Central Kalimantan by regenerate configuration and preserves the structure of the previous wholeness such as activating rice and urban farm would maintain the integrity and viability of the natural system. The result shows a strong center is the lowest properties for fundamental dimensions, not separateness for tangible and intangible of rivers network asset dimension, deep interlock and ambiguity property is the engagement among tribes.

1. Introduction

The historic urban landscapes and conservation relation between human and tropical peatlands have been analysed by several authors from several points of view. Thus, conservation in the city is regarded as an element to be managed from the economic and social perception of environmental risk control. The current status of the wetland environment in Kalimantan and global consequences of tropical peatland degradation in terms of loss of various ecosystem and habitat services have been highlighted [1-3]. Thus, peatland ecosystems have to be saved due to fragile soil. The present condition of the ecosystem is being destructed and starting to release carbon emission. Therefore, the appropriate management system is required to activate habitat function [4], peatland restoration [5] through the peatland-use scenarios considering land-use system and its impacts at a regional and local level [6,7]. The reasonable development of urban areas is also sought by means of urban waterfront analyses [8]; [9,10], giving rise to the debate on the respective advantages and disadvantages of its public or private management [11-13]. The River is one of the most prestigious elements for local culture characteristic.
both the city of Banjarmasin in South Kalimantan and Palangka Raya in Central Kalimantan. A paradigm from people outside Kalimantan is presumed that the island is full of forest, green, and mangrove in every place, but in fact, the exploration natural resource such as illegal logging, coal mining, and oil palm forest is overdoing it without thinking in term of natural balance and order from the surrounding.

The most conservationist in Indonesia focuses on the long-term needs of surviving deposits, sites and artefacts, thus the research needs to support knowledge of environmental management. The project development of Central Kalimantan has also increasingly but the assessment of significance based on local characteristics has a dramatic impact on how Banjarese urban areas are passed on to future generations. The identities of Barito and Martapura River are the most majority properties that have taken place for strategic redevelopment of waterfronts and riverfronts in South Kalimantan. Furthermore, the Kahaya River in Palangka Raya City has also described the linkage of the origin of between Central and South Kalimantan that the people appear to be a very strong river culture. Increasingly, a hundred infrastructure projects have been done for the last decade in Palangka Raya while tourism is not be seen as a priority project for increasing area income yet.

Palangka Raya and Banjarmasin are both historical cities that serve as forerunner old cities in Kalimantan of structural features loss and of coherence revitalization over five periods. Although originally founded as strategic points for infrastructures, health, and education, in the 1957s, after the Central Kalimantan had province separated from South Kalimantan Province were gradually dominant and boundaries as a result of territorial authority, land and river formation, urbanization, and a lack of understanding local community, and environmental awareness. In the 1998s and 2000s, this situation became an opportunity to revise identity and to provide new vision cities, commercial, natural, and cultural tourism resources, and to create new urban centrality with eco-waterfront development leading role. This paper first, undertakes a literature review of publications analyzing the conservation of tropical peatlands projects in South and Central Kalimantan Province; second, identifies the fifteen properties in nature of order Christopher Alexander and particular characteristics through visual analysis that carried out as regards the city evolution, pattern formation, and social control features; and third, proposes future lines of research in the conservation of tropical peatlands interface studies.

2. Literature reviews

2.1. Theoretical frameworks

When Christopher Alexander [14] proposed a book that aims to support people's awareness of natural living. A Pattern Language is his ideas that aimed to understand the evolution, transformation, adaptation through languages that are countless based on the ordinary people made. He states in his book The Timeless Way of Building, the wholeness and life in a society have their own characterized. It will have its particular pattern and distinctions, resilient societies, there will be pattern variation and distribution even with these languages are shared and unique. Alexander has arguments about the town in any one size category that should be uniformly distributed across the region: economic and ecological arguments.

Christopher Alexander explores the properties of life itself, highlighting a set of well-defined structures present in all order and in all life from micro-organisms and mountain ranges to good houses and vibrant communities. The concept of wholeness and theory of center in The Nature of Order, Book one [14], proposes a scientific view of the world in which all space matter has perceptible degrees of life and sets this understanding of order as an intellectual basis for a new architecture. As a result, Alexander identified fifteen structural features that appear and correlate with the degree of wholeness which things have. It shows how center intensify each other: (1) Levels of scale, (2) Strong Center, (3) Boundaries, (4) Alternating repetition, (5) Positive space, (6) Good shape, (7) Local symmetries, (8) Deep interlock and ambiguity, (9) Contrast, (10) Gradients, (11) Roughness, (12) Echoes, (13) The void, (14) Simplicity and inner calm, and (15) Not-separateness.
2.2. Recent publication
There has been a lot of research on the application of pattern language, many of which have addressed the positive features of pattern in the way of people's behavior and phenomena of nature. In their research, Iwanczak investigates the relationship between the presence of patterns in an urban landscape and the type of elicited emotion [15]. Since the type of core effect may be considered as a marker of the place meaning (conservative vs. progressive). It argued the agreement with the strongly biophilic approach present in Alexander’s works. In their study, Iba et al., has illustrated and summarized the fifteen fundamental properties through showing the plots of the correspondence analysis of the properties [16]. He investigated problem finding in a certain domain, by collaboration among people who all have tacit knowledge for the target domain more or less. They found recognition for the situation of making a pattern language with one type among many and methodology for designing media for the spontaneous and collaborative community.

3. Materials and methods
Our research complied with the following three steps: (a) Data collection are chosen based on international and national academic papers and governmental archives to achieved the urban area identification; (b) the analysis of previous publication to extract information about feature structures from urban areas in South to Central Kalimantan Province based on historical maps collection; (c) a comparison of both the city of Banjarmasin and Palangka Raya case studies to identify and recognize parallels and distinction in the visual application. These steps were guided by the following criteria: (1) The paper analyzed were published in Indonesia National Archives such as books, book chapters, articles, and several recorded webinar about Kalimantan during the pandemic ; (2) The publication paper were collected from 1968 to 2019 to bring together all conservation tropical peatland and urban regeneration that have been studied and published over the last two decades; (3) The keywords combination were used and searched for in the papers such as conservation, the fifteen properties, tropical peatlands, urban area, and regeneration. The pattern analysis serves to summarize and visualize black and white box containing fifteen categories and is a generalization of principle the fifteen fundamental properties in nature, instead of quantitative.

4. Results and discussion
The identification of publication is a compilation of a serial list of the conservation of tropical peatlands and regeneration projects. Social, economy, culture, and environment are taking consideration in term of related to systemizing the comparison of the previous projects (Figure 1).

Figure 1. Interaction of Fifteen Properties (from Nature of Order, Book One, page 238) and from South to Central Properties of Kalimantan.
4.1. Diversity projects
The correspondence of data analysis has been carried out in order to have statistical data analysis based on the project information. This analysis serves to summarize and visualize a data set divided into two categories variables. In South and Central wetland, projects have been classified based on OECD that carried out in all sizes of urban areas. Four-generation historical maps can be identified base on the transformation of land-use formation in a period of years. Two areas are selected based on ecological-economic analysis of wetland areas analysis, one mega rice project of wetland conversion for about 1.45 million ha from a total of 5.8 million ha wetland in Central Kalimantan) was started in the period 1995-1999. Thus, the second generation projects in 2020 as one of, national strategy projects in Indonesia for food estate management are the most popular debates among conservationists, urban planners, and the Kalimantan people. Indeed, the tribes’ communities have experienced for their living structure transformation and wetland conversion effect on socio-economic for their surrounding environment. Note also that most of the projects analyzed in South Kalimantan were begun in the decade 1974-1979 (2nd of five years development) through transmigration program, while South Kalimantan half of the area’s projects correspond to the. (development of Masjid Raya Sabilul Muhtadin), 1991 (Wasaka'Museum), 1997 (Barito Bridge), 2000 (Banjarbaru City established), 2006 (Balangan and Tanah Bumbu Districts established), 2006 (Siring garden along 320-meter Martapura riverside), 2008 (Syamsudin-Noor International Airport runway established), 2009 (Banjarbaru governor building), 2009 (Electric steam power plant in Asam-Asam), 2009 (normalization Barito River channel), 2011 (Regional secretary building).

4.2. Case study
Regarding the case study selection, it should be recalled that based on the research topic, the South Kalimantan Province should have used the living center of the degree of life in their spatial configuration designs. Therefore, after investigations, it was found that the properties of the South have such characteristics and they can be used and tested as valid implemented samples. Finally, it was attempted to analyze the two different case studies to generalize the subject matter to measure and approximate calculation the effects of the living structure on the spatial configuration of the fifteen properties. It is noted that both cases studies are located in Kalimantan, which is the oldest city in Borneo of Indonesia, and are in the tropical wetland environment and have similar socio-cultural characteristics properties.

4.2.1. Tropical peatland from South to Central Kalimantan Province, Indonesia. Over the last several decades the tropical peatland of South and Central Kalimantan has drawn a degree of interest not present in Kalimantan at least since the latter half of the 19th century, when the great long timber houses, wetlands, river networks, and tropical rainforests, and other built indigenous properties of the interior attracted the attention of the world. Both areas boast several environmentally fundamental properties in nature aspects. The design of the properties, especially the centers, wholes, and boundaries. The flowing water of the rivers is reflected homogenous imperfection. There are several prototypes of flowing stream of South and Central Kalimantan’s river such as the fast and slow, the warmer upper layer, the relatively colder depths, the sunny areas, the muddy shallow parts. The wholeness of that integrity of each sub-system stream creates a center. Generally, the strength of the center has a degree of life that is a measure of habitat organization. The wholeness of peatland habitat is a treasure that contributes to resolving climate change problems. Thus, fifteen properties appear through the center of the river as geometric features of the way that natural spatial organization, and the way the centers that appear in spatial distribution.

4.2.2. Conservation and regeneration. The value of from South to Central Kalimantan areas great designed fundamental properties, particularly its wetland habitat and ecosystem, has long been recognized by visitors as one of Kalimantan contributions and the 3rd largest island in the world to Indonesia natural resources and culture. Many indigenous conserved areas include historic buildings and landscapes, which may or may not be on the Indonesia Heritage register. In urban areas, the
conservation areas might comprise a distinctive 16th-century vernacular residential development around the rivers. In a rural context, a conservation area may comprise designed vernacular farmhouses and wetland agricultural landscapes. Historic Environment and regeneration projects have a spectrum of interaction levels, while in the end heritage concepts act as a catalyst.

4.3. The simulation of fifteen fundamental properties model

The fifteen properties have identified and occurred repeatedly in both South and Central Kalimantan which have life. It occurred repeatedly throughout all of natural wetland. Principle way related between centers to other center. Center is a reflection of the existence of life. It appears (1) level of scale appears in variation of longhouses and high ridge houses. The most iconic of Bekantan colony (proboscis monkey) are should become a (2) strong center of wetland ecosystem coherence, however it almost nowhere exists in both areas due to the habitat loss, illegal poaching, and land conversion. (3) Boundaries of living cell in the banks of Barito and Martapura River for South and also Barito, Mentaya, and Kumai River for Central Kalimantan. (4) Alternating repetition are found in river waves, freshwater fishes, galam forests (Maleleuca sp). (5) Positive space may be seen in the 17th century Banjarmasin plan of South Kalimantan while in the middle of 19th century of Palangka Raya plan of Central Kalimantan. (6) The good shape is appeared in the bends of thousands rivers. (7) Local symmetries in the formation of different pattern of spatial living through historical maps. It is therefore possible to construct a single overall order of coherence for pattern variation. The photograph by the strips in order of perceived coherence. (8) Gradients may be emerged in stream flow of rivers and branches rainforest trees. (9) Echoes is seen peat swamp land and mud formation. (10) Roughness appears throughout the floating houses, floating traditional market, and house on stilts. (11) Contrast appears as the result of differentiation in the formation of swampland. (12) Deep interlock and ambiguity appear throughout the Dayaks, Banjarese, and Malays ornaments. (13) Simplicity and inner calm may be see in the surface of a river as in the line of dewdrops of the leaves swampland, (14) The void make its appearance in the mosques of Sabilal Muhtadin (South) and Darussalam (Central). Finally, a thousand of rivers that stretches from the South to the Central of Kalimantan are (15) Not separateness in Barito River-bed ecology.

5. Conclusion and further research

The conservation of tropical peatlands from South to Central Kalimantan is a phenomenon that has been observed since the 1990s in various Kalimantan cities. Such transformation, which adopts illustration of the fifteen properties proposed by Christopher Alexander in The Nature of Order, Book One (Alexander, 2002) to both case studies, adhere to a general peatlands conservation strategy: the creation of a level of scales and boundaries use and for the citizens’ leisure activities. These properties are often characterized by the introduction of oriental social uses, including floating market, house, and restaurant, and incorporate landscaping, bridges, and other tourist attraction. However, the strong center is unfortunately must conserved and emerged swiftly. A further aspect to highlight, and it is considered that fifteen fundamental properties as an interface of complementarity achievement for urban conservation and regeneration for the wetland environment.

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