

## Preservation of Tourism-Kampong towards Green Environment

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### Abstract

WTO (World Tourism Organization) is a worldwide organization that takes into account issues of tourism in improving the economic, social, cultural, and environmental sector. Indonesian tourism has the opportunity to empower the existence of tourism-kampong, which have the local wisdom cultural heritage potency as a valuable asset to the green-environment. Development of a comprehensive tourism-kampong is conducted by combining the various stakeholders which affect the increase of the local wisdom cultural heritage potency. At this time, people still tend to not pay attention and understand the existence of the local wisdom potency in the development of tourism-kampong towards the Green-Environment through sustainable conservation.

This research was conducted with the descriptive qualitative method, based on the dominant factor of the historical value local wisdom domestic potency, related to the socio-economic-cultural characteristics potency with a green-environment approach. Until now, no study has recommended the formulation of a model of the tourism-kampong development concept through sustainable preservation towards green environment. This condition causes the not yet emergence of government and public policy that focuses on the local wisdom cultural heritage potency in the embodiment of the green-environment in the tourism-kampong historical district. The research location was the Laweyan Batik tourism-kampong historic district, which until now still exists

This study aims to get a tourism-kampong development model formulation towards the green environment through the exploration of the local-wisdom characteristics potency both physical and non-physical, which is a research study that urges to be done. Thus, the tourism-kampong local-wisdom potency can be preserved, developed, and packaged through sustainable preservation; appropriately, uniquely and originally. The results of the study show that the application of the concept of Green-Environment through sustainable preservation in the Laweyan Batik tourism-kampong has several advantages and linkages in the handler pattern which are more environmentally friendly; because it is safer, more harmonious and aesthetically, whatever it is have awareness to control the sustainability of the maintenance.

### Introduction

Preservation or cultural heritage conservation is a global issue that has long been an international attention through various charter declarations, including the 2010 Euro-Asian WHC (World Heritage Cities) being held in Surakarta. All this time the existence of the historical district, including cultural values that have high cultural significance and historical viscosity, has not been addressed and managed optimally. This trend is visible where some areas lost its original character, even damaged and destroyed because lacking in maintenance [1]. Furthermore, the preservation of the historic district in urban architecture is one of the region attractions. The preservation of heritage potency in a region will provide continuity of close ties between; past, present, and future [2]. Thus, the circumstances of the past that is expressed by the

physical state of the historical district will also determine and provide a unique identity for those areas in future sustainability. So, without worthy ongoing conservation efforts, an area will lose the history and identity that connects us with the past [3].

A tourism-kampong is an area or a kampong which have advantages of uniqueness and local-wisdoms (physical and non-physical), which is packaged as a typical tourist attraction, highly competitive, and interestingly and attractively managed and presented. This is done by developing a harmonious tourist support facilities and good integrated management [4,5]. Therefore, the flowering of tourism-kampongs towards green tourism through sustainable preservation is one of the best solutions in the development integration of a sustainable tourism sector. The tourism-kampong development is in line with the mission of Solo

as a city of culture and tourism, namely; “Solo’s past is Solo’s future”. The implementation of Surakarta’s 2005-2025 Regional Long-Term Development Plan is through the optimization of the tourism potential; and policies to preserve, develop, and appreciate the values of local wisdom as the nation self-identity. The Surakarta development policy which focused on the priority programs under the law of Legislation No.9 / 1990 on Tourism, that is by performing the development and improvement of the uniqueness and local-wisdom potency, where one of them is Surakarta’s Laweyan batik tourism-kampong. Until now, no study has recommended a tourism-kampong development model through sustainable conservation towards green tourism, resulting in the absence of government and public policy which gives attention to the growing development of tourism-kampong. This study used an environment-oriented paradigm, as well as the appreciation of concern in realizing the development strategy formulation of the friendly and sustainable tourism-kampong.

## Methodology

This research was conducted with the descriptive qualitative method, to collect data through observation and in-depth interview with community leaders on the local wisdom potency related to the socio-economic-cultural characteristics potency, with a green-environment approach.

The study was conducted in the Surakarta Laweyan tourism-kampong historical district, based on the dominant factor of the historical value local wisdom domestic potency, related to the presence of the Pajang Kingdom.

## Results and Discussion

### Surakarta Laweyan Batik Tourism-Kampong Development Trough Sustainable Preservation

Sustainable Preservation of the Laweyan batik tourism-kampong district is based on the principles of sustainable development set out in Agenda 21, which basically emphasizes the importance of managing resources in a sustainable and responsible way (ensuring the interests of present and future) and environmentally sound (the achievement of harmony, conformity, and balance, between human and the environment).

Laweyan batik tourism-kampong district is one of the historical districts in Surakarta that includes a Cultural Heritage Reserve which established (by Kyai Haji Samanhudi) a national movement of the Islamic Trade Unions that is the first trade association founded by the indigenous batik producers and traders in 1912 [6].

Laweyan batik tourism-kampong district is included in the Village of Laweyan at the Sub-District of Laweyan, situated on the banks of the Jenes River; which was an important means of transportation during the Pajang Kingdom. Laweyan batik tourism-

kampong district is administratively bordered; on the north by Dr. Rajiman Street, on the east by the Village of Bumi, on the south by the Kabanaran River, and on the west by the Premulung River which is the border between the Village of Laweyan and the Village of Pajang; where the Pajang Kingdom was once established with its famous king Sultan Hadiwijaya/Joko Tingkir [7].

Laweyan batik tourism-kampong district have some artifacts that still exist and maintain its existence, including the Kyai Ageng Henis tomb, the Kabanaran port, the market monument, and Langgar Merdeka, as well as several houses of juragan (enterprise owners) which tend to be oriented to the Javanese culture but have foreign influences by accentuating the shape of the building with straight and curved lines (Indisch).



**Figure 1:** The site research mapping. (Laweyan Surakarta, Central of Java Indonesia). Sources: W. Setyaningsih, 2015.

The houses of batik juragan tend to double as a home and a batik home-industry. The area of the owner batik house are various; the large size have an average area of 1000-3000m<sup>2</sup>, the medium size 300-1000m<sup>2</sup>, and the small size 25-100m<sup>2</sup>, and the height of 8-10m. Usually there is an open space around it as batik sunning area. In the 1960s the Laweyan region batik industry experienced heyday, land use is dominated by the activities of the batik industry. Land use in the area of the Laweyan kampong formed two large groups of settlements; the juragan settlement and batik workers settlement [6].

The conservation efforts of Laweyan batik tourism-kampong district is an act of cultural resources management, which is conducted either through the process of non-government non-formal decision making and or formal political decision making, in order to maintain the region such that the meaning of cultural (historical value, architectural, culture, or traditions which indicate the quality of human life) can be maintained for generations past, present, and future, and the sustainability will be maintained.

In applying the principles of sustainable conservation, it requires a concept to protect the building and the historic area that should be seen as a process that involves the integration of the various components and relevant stakeholders, which emphasis more on the preservation of environmentally-sustainable, with

the utilization of potential and existing resources for the benefit of the wider community. The historical district with its unique characteristics, the environment has a special feel, as well as a wide variety of customs and traditions, so the potential to be preserved in a sustainable manner [8,9].

Eventually realizing sustainable conservation of cultural heritage, which has continuity with the past for future generations, which is packaged properly, creatively, and sustainably, without leaving the image and local character as the embodiment of the development of tourism-kampong towards green-environment, is our collective duty which must be followed up immediately. The concept of protecting buildings and the historic area should be seen as a process involving various stakeholders that more emphasis on the utilization of potential and existing resources for the benefit of society [10]. The sustainable conservation of the Laweyan batik tourism-kampong historic district is one of the attractions for tourism assets, which will provide continuity of the close ties between the past, present, and future. Accordingly, the state of the past that is expressed by the physical state of the historical district, will also determine and provide a distinctive and sustainable identity for an area in the future. Thus, the sustainable conservation of the Laweyan batik tourism-kampong historic is necessary, thus history and identity that connects us to the past will not be lost.

### **Laweyan Batik Tourism-Kampong District Application towards Green Environment**

Spatial pattern of the Laweyan batik tourism-kampong district, forms a grid, a straight line parallel to the Kabanaran River on the back, and parallel to Dr.Rajiman Street as the main entrance access. In the grid pattern, there are several groups of batik juragan settlements located in the central and northern regions, while the settlement of batik workers in the south, along the banks of the Kabanaran River. Now the Laweyan batik tourism-kampong district has changes and shifts of spatial, building, environmental and utilization functions, which was originally as the center of batik industry that occupies old buildings, into a multi-functional area or mixed use (Roychansyah & Diwangkari, in Setiawan, 2010) [11]. The pattern of land use in the Laweyan batik tourism-kampong district consists of residential mixed with commercial (batik showroom, batik industry, and non-batik industry), as well as other tourism support facilities (home stay, cafe, public toilets, etc). Thus, it appears the tendency of changing patterns of the Laweyan batik tourism-kampong district is due to a change in function of the area, and changes in behavior and culture of the local community.

In the relocation plan and recreation city special elements, especially the Laweyan batik tourism-kampong district, is functioned as an area for batik home industry, and is directed to organize and disciplined the system and its kind of home industry by providing industrial sewerage system as in Surakarta's 2007-

2026 General Spatial Plan of the City.

Applying the concept of green-environment in the Laweyan batik tourism-kampong district is one form of conservation that aims to develop and create alignment between the green environment with human in harmony and balance in order to put into realization the convenience and hospitality. In an environmentally-friendly planning of spatial, building, and region, in order to put into realization the creation of an attractive and aesthetic spatial, awareness and concern is needed for each community to participate actively in "greening", then it implies that the region could be called a green environment. Green-environment concept requires an environmentally-friendly planning of spatial, building, and region, in order to put into realization the creation of an attractive and aesthetic spatial.

The development forum of the Laweyan batik tourism-kampong have done some activity programs in improving local facilities in developing the Laweyan batik tourism-kampong towards green environment, among which are

### **Green Community**

In towards the green community, the active participation of the Laweyan community involvement together with various stakeholders (government, business, and community) in building an environmentally friendly green environment has been seen with the programs of activities in various fields.

Various methods are used by the Laweyan community, for example by developing attention, sensitivity, and or community care, in an effort to preserve a friendly area, especially in public facilities or public services, persuasive way to build and maintain public facilities are made through socialization, campaigns, and provide display in public areas.

Green community by the Laweyan community is with, among others, the establishment of the development forum of the Laweyan batik tourism-kampong (which consists of the entire Laweyan community) on September 25, 2004. The green community in Laweyan batik-kampong is certainly the participation of governments, businesses, and communities that have been organized and established in development forum of the Laweyan batik tourism-kampong. The management comprises various elements of the Laweyan society, both of batik business people, youth, and entrepreneurs, as well as other sectors. The goal is to build and optimize the Laweyan kampong potency to bounce back and prepare them to face the challenges of globalization.



**Figure 2:** Green Community Development of Tourism-Kampoeng Laweyan Source: Documentation W. Setyaningsih, 2015.

## Green Planning and Design

Green planning and design of Laweyan batik tourism-kampong is the planning and design of the region aimed at improving the quality of spatial planning of urban areas, which are more sensitive and responsive to the green elements (street furniture, street lights, signs, and pergola). The existence of a pergola every eleven meter is a form of environment roadside order, so the settlement becomes fresher, more colorful, and gives the familiar impression among the people. The eight elements related urban areas are: land use and buildings, circulation and parking, open space, pedestrian, supporting activity, a marker and preservation.

No	Cultural meanings	Assessment of sub-variables	Considerations	Applications
1	Aesthetics. Based on the quality of the room's shape and details.	Shape, structure, spatial, style and ornamentation of the building	Aesthetic related to the value of beauty and architecture (shape, style, structure, spatial, and ornaments), particularly in terms of the external appearance of the building / facade, or part of a region/city which represents a special achievement or certain historical styles	
2	Plurality. The value of the uniqueness of a work can be a force of a certain period.	Shape, decoration, special / specific kind, as a symbol of cultural traditions	Benchmarks specified in the form of a plurality of variance or special type specific. How far is the object of preservation will represent a variety, a special type of specific, or symbolizes a cultural tradition.	
3	Rareness architectural must remain in the original historical location	Shape, type, age, and style of the building	A type of work that represents the rest of the last legacy of style that represents its time, that no other areas including the uniqueness and its visual opulence	
4	Incredibility. Privileges are very valuable and gave the signal for the city as a whole	Shape and distinctive value, style specificity or uniqueness, and the scarcity of building	In connection with the value of the privilege/specificity, unique and the scarcity as a landmark of the region, perhaps as the only remaining, the oldest/the location are outstanding. Based on elements such as the rarest, oldest, largest, longest, the first of its kind	
5	The role in history All of role has historical value of developed mental events of a city	Value, age, and history of the building owned	In connection with the historical events are held, associated with a series of symbolic historical development of the city, the architecture, and the struggle of the nation, the historical development of the region, as well as the history of the town	
6	Authenticity of building Protect & deliver valuable legacy to future	Structure, value, age of the building. The rate of change, the original shape of the building, facade,	In connection with the extent of the changes (physical form outside / inside the building, either through addition or subtraction of the amount of space, structural elements, details of ornamentation)	
7	Maintained. Must be able to ensure the safety and maintenance in the future.	Physical condition and function of the building	In connection with the physical condition of the building (the extent of damage, the remaining percentage, and hygiene, empty / not occupied but the conditions are good, or damaged and neglected)	
8	Strengthening region. The presence of a sense of place identity in a friendly atmosphere and comfortable renewal	The influence of the presence of the building to the surrounding area (shape, style, scale, and proportion of the building)	In connection with the influence of the presence of the conservation object, are very meaningful to improve the quality and image of the surrounding environment (formed by a plurality, unity, continuity, or the contrast of the building). The building can be a reference for the citizens of the city or the region bookmark	

**Table 1:** Analysis of Sustainable Preservation of Historic Buildings, Based on Cultural Meaning Variable at the Laweyan Batik Tourism-Kampong District. Source: Analysis Results W. Setyaningsih, 2015.





**Figure 3:** Green Planning and Design Development of Tourism-Kampoeng Laweyan Source: Documentation W. Setyaningsih, 2015.

Residential spatial of the Laweyan area, particularly belonging to the batik merchants, are influenced by the residential character of the Javanese nobility. During its development, to reinforce its existence as a specific region, the characters of the building in Laweyan were influenced by European and Islamic architectural styles, hence many Indisch (Java - Europe).

Laweyan have an environment system that is quite unique. The streets are small which tend to only be wide enough for one car, so it seems like an exclusive environment. Small narrow alleys are the hallmark of the Laweyan district. The houses are huddled together under the covered impression with the distinctive architecture. In the middle there is a door to get into the area of the house. Overall the effort to implement green planning is already visible, such as the presence of drainage, clear sewer pipes, and the trees that grow on one side of the road, although the effects is not too shady.

### Green Open Space

Application of green open space at the Laweyan district is to improve the quality and quantity of green open space through a variety of strategies. This is related to the following: urban building coverage, and urban voids, and linkage roads, pedestrian pathways and open space, as a means of unifying the various activities in the physical form of the region [12,13].

In terms of function, green open space can provide benefits in aspect; aesthetic (beauty), ecological, protective, hydrological, hygienic, climatologically, educative, social, so as to reduce environmental problems, low air pollution, flood free, low noise, and other of environmental problems.

The existence of green open space in the Laweyan district are found in several places, including that in the area along the river, the corner of the street, curb, and vacant land at the edges of the road. The first area is the natural flood plains; the area is covered with lots of trees and plants, so as to prevent erosion of soil by water streams. Artificial park area in the corner of the street, has added beauty with the presence of trees and plants, and also adds to the quality of oxygen, and soothing the environment by providing its own color for the region. The existence parks balanced the environmental filled with houses and other buildings, as well as paved roads. Last area is the edge of the road with a kind of hedge shrubs. The edge of the road also looks more cool and fresh; not dry.



**Figure 4:** Green Open Space Development of Tourism-Kampoeng Laweyan Source: Documentation W. Setyaningsih, 2015.

### Green Waste

Green waste at the Laweyan district is an addition, green waste management is also supported by the environmentally friendly processing technology and waste disposal.

Good sewerage also been seen in the Laweyan district. The Ndalem Tjokrosoemartan building which has a dual function as a shelter and a batik factory, has good sewage pipes which channeled batik waste to the Waste Water Processing Installation (from the German government), and for shelter waste also channeled through the drainage. In addition, the placement of the rainwater drain pipe from the roof also has a pretty well set of flow into the drainage channel. One of the first steps to the empowerment of the Laweyan kampong is to build the Waste Water Processing Installation which was constructed in which it serves to treat industrial wastewater so it is acceptable to flow into the river; harmless, and environmentally friendly.



**Figure 5:** Green Waste Development of Tourism-Kampoeng Laweyan Source: Documentation W. Setyaningsih, 2015.

### Green Transportation

Green transportation at the Laweyan district is sustainable transport, to encourage people to use becak public transportation or mass transit environmentally friendly to reduce the use of private vehicles, the creation of the infrastructure that supports the development of mass transit, reducing vehicle emissions, and create a friendly road space for pedestrians and cyclists.

The main road network in the Laweyan batik kampong district are regular patterned grid. Type of road is composed of; roads, the environment, and the hallways between homes and alleys. Condition of roads in the neighborhood of the Laweyan batik kampong district are generally good, either side bounded by a high wall paved with a width of 3-6 meters; there are a small roads/narrow alleys 1-2 meters wide made of paving blocks.

At the Laweyan batik kampong district it is already visible of the public awareness about going green transportation which

can be quite good. This is because the road contained in this area is quite narrow, so it will be difficult if passed by the cars. Therefore, in general, people prefer to walk if the destination is still considered close, but if the destination is far away, motor transport will be their choice.

Green transportation at the Laweyan district is also supported because this area is a batik village, visitors / tourists prefer to go around by walking or becak because in addition to saving, they can also enjoy batiks on The Laweyan batik kampong, also supports the passage of the Green Transportation.



**Figure 6:** Green Transportation Development of Tourism-Kampoeng Laweyan Source: Documentation W. Setyaningsih, 2015.

### Green Water

Green water at the Laweyan district is the efficiency of utilization of water resources which aims to conserve water usage. Green water is an effort to improve water quality by applying the concept of zero runoff and eco-drainage. On some road corridors that have the concept of green water, is the use of paving a road material, with some parts of the park are left not closed (not cemented but ground soil) so that rain water can descend directly, absorbed into the ground.

At about the Laweyan district, seen several reservoirs to store rain water which will then be absorbed, and the rest flowed into the river slowly. There are also recharge wells on the front of the house, to accommodate and absorb rain water that falls from the roof of the house.

For wastewater treatment in the batik industry in the Laweyan district is good enough, because there is the Waste Water Processing Installation which can reduce the pollution that occurs. The wastewater treatment system begins with collecting waste from industrial houses in 11 wells located on the river bank. Once collected, the batik waste is processed and filtered in wells containing oxygen. After this process, the waste water is flowed into the river through small pipes.

### Green Energy

At the Laweyan batik kampong, the source of electrical energy is still dependent on the State Electricity Company. Laweyan batik kampong still uses electricity as the main energy in buildings and daily activities.

Although still in the scale of the home industry, the demand for electricity is big enough. Not to mention the need for electricity to households these days, which uses additional electronics for temperature and lighting systems in the house, such as the use

of air conditioning and lights on during the day, it is caused by environmental conditions that the distance between the homes coincide, and social circumstances of its resident who tend to be introverted, so that they will build a house with high wall fences so that supply of sunlight and fresh air diminish.

### Green Building

Green building at the Laweyan district is the structure and design of environmentally friendly buildings to reduce negative impacts, construction is efficient, both in the design, construction and maintenance, by applying energy-efficient green buildings, is economical, effective, durable, and comfortable. Building located in the area around still uses the concept of building in general, namely the building are made from brick.

In some places in the Laweyan district, Mahkota Laweyan batik house, where there is an element of green building with pergola application that uses vegetation as a constituent element. There is also Langgar Merdeka which has many openings such as windows and doors, where the material is made of natural material frames which is wood. One of the requirements of green building is attention to air quality and comfort of the room, because by applying many openings; the air quality inside the building is good.

To create a comfort at the Laweyan district, the environment requires the components of street furniture on the environment (street lights, sign/map of Laweyan batik-kampong, trash can and pergola). The provision of seats in the Laweyan district on a street corner can be assessed as supporting green-environment. Near the chair can be big trees and plants around it so that it looks greener and protected from the sun. The roof of the seat can also be designed as a kind of garden roof or pergola covered by vines. The use of these plants is an effort to support the concept of green environment.



**Figure 7:** Green Design Development of Tourism-Kampoeng Laweyan Source: Documentation W. Setyaningsih, 2015.

### Conclusion

The application of the concept of green-environment through sustainable preservation has several advantages and linkages in the handler problems pattern which are more environmentally friendly; because it is safer, more harmonious and aesthetically. Environmental management in small scale allows the public to contribute greater, lower cost handling, and low-impact development of areas. The Laweyan district areas development concept require a special approach, so that changes in the spatial

pattern, building and the environment, can be more attentive and nutritive of the natural local conditions characteristics in a sustainable manner.

The application of the concept of green-environment through sustainable conservation (in maintaining and optimizing the historic district as a tourism-kampung that has a green-environment quality), especially for the Laweyan district can be achieved by stages;

- 1) Identify the tourism-kampung potency character domination as the development of the tourism sector which includes physical and non-physical (building artifacts, social, economic, and cultural).
- 2) Empowerment of non-physical potency; increase the active participation of local communities which is rooted in the local-wisdom.
- 3) Structuring green environment-based region through sustainable conservation of natural resources, in the physical development of the village area which are environmentally friendly and sustainable.

## References

1. Setyaningsih W (2009) Model Pelestarian Kawasan Bersejarah Melalui Peningkatan Peran dan Interpretasi Masyarakat Sebagai Alternatif Pengembangan Wisata Budaya Yang Berkelanjutan, Hasil Penelitian Dikti.
2. Antariksa (2007) Pelestarian Bangunan Kuno sebagai Asset Sejarah Budaya Bangsa, Pidato Pengukuhan Jabatan Guru Besar, 3 Desember 2007, UNBRA Malang.
3. Laretna TA (1997) A Study the Conservation Planning of Yogyakarta Historic tourist City Based on Urban Space Heritage Conception, Thesis S3, University of Kyoto, Japan.
4. Lane B (1994) Sustainable Rural Tourism Strategies: A Tool for Development and Conservation. *Journal of Sustainable Tourism* 2: 102-111.
5. Nuryanti W (2010) International Seminar, WISDOM 2010, Local Wisdom Inspiring Global Solutions, World Conference on Culture, Education and Science, UGM Yogyakarta, December 5-8<sup>th</sup>, 2010.
6. Widayati Naniek (2002) Permukiman Pengusaha Batik Di Laweyan Surakarta. Desertasi S3. Fakultas Sastra Universitas Indonesia, Jakarta, Tidak Diterbitkan.
7. Priyatmono Alpha Fabela (2004) Studi Kecenderungan Perubahan Morfologi Kawasan di Kampung Laweyan Surakarta. Tesis Tidak Diterbitkan. Yogyakarta: UGM, 2004.
8. Timothy DJ, Boyd SW (2003) *Heritage Tourism, Themes in Tourism*, Prentice Hall.
9. Nuryanti W (1996) Heritage and Postmodern. *Annual of Tourism Research* 23: 249-260.
10. Prayitno B (2013) An Analysis of Consolidation Patterns of Kampung Alley Living Space in Yogyakarta, Indonesia. *Journal of Habitat Engineering and Design* 5: 98 - 111.
11. Setiawan B (2010) Kampung Kota dan Kota Kampung, Potret Tujuh Kampung di Kota Jogja, PSLH UGM, Yogyakarta.
12. Setyaningsih W (2013) The Kauman Settlement in Surakarta and the Typology of the Rumah Ketib, Insular Diversity, Architecture-Culture-Identity in Indonesia, Published by Institute for Comparative Research in Architecture IVA-ICRA, Vienna, Austria and Department of Architecture and Planning Faculty of Engineering, Gadjah Mada University Yogyakarta, Indonesia. ISBN 978-3-900265-16-4.
13. Setyaningsih W (2013) Konservasi Umbul dalam Pengelolaan SDA (Sumber Daya Air) menuju Eco-Green Environment melalui Wisata Tirta yang Berkelanjutan. *Jurnal Lingkungan Indonesia* Vol.1 No.1 ISSN No 2338-4069 Juni 2013. Perhimpunan Cendekiawan Lingkungan Indonesia (PERWAKU) dan Program Studi Ilmu Lingkungan (PSIL) Program Pascasarjana. Universitas Indonesia (UI).