

Conference Paper

Open Street Map-Based Participative Mapping for River-Kampong in Surakarta

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Abstract

Open Street Map (OSM) is a free-editing world map providing web-based spatial information that can be changed in the sense of data updating by everyone, whenever, and wherever. With the data yielded, OSM is very useful in social mapping, disaster mapping, economic mapping, and an area's terrain mapping, particularly, urban area. In Surakarta, OSM is used for the first time in mapping Kali Pepe (Pepe River) specifically aiming to map the river stream area to cope with flood disaster and generally aiming to provide spatial information with recent data in Surakarta. The utilization of OSM in Kali Pepe mapping was expected to be the beginning of OSM development in Surakarta that would provide digital map data that can be used not only for responding to disaster but also for providing usable data as the reference in policy formulation for Surakarta City Government in economic, cultural and development areas. This study aims to show the result of OSM utilization in the mapping of Kali Pepe in Surakarta for society, stakeholders related to spatial information and also government as the policy maker. The conclusion is that OSM is one of digital mapping that was not popular in Surakarta due to its limited information and accessibility.

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1. Introduction

City changes in many forms and ways. One of them is in the change experienced by kampong (village) settlers along the river, which is one of natural resources that support the social and physical life functions of society. Human and cultural development is inseparable from the existence of river as well. In its history, rivers contributed to transportation, life source, residence, and even became the origin of population development and city establishment in Indonesia [6]. The existence of rivers has a very close history with Indonesian society. However, in the development of city over times, there are many effects of river and surrounding environment [8].

The swift urbanization has led to slum areas, some of them along the river bank. Population increase in the slum areas and large-scale industrial development have

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created a situation where the river is often used to dispose waste and industrial effluents. City authorities are under pressure to provide, maintain and develop a variety of facilities to accommodate the demand for clean water from the public and industry. There should be good city governance involving government, private, and community groups in order to establish synergy and partnership to protect the river conditions. The position of partnership approach in environment-oriented city development becomes important amid the attempt of involving community in environment and natural resource management [2]. The Open Street Map-based mapping scheme is an example of the partnership in producing the knowledge in the form of mapping the city's river system and promoting it to the urban people.

2. Method

DAS Bengawan Solo (Bengawan Solo River Flow Area) flows through Surakarta City in two tributaries - Kali Pepe and Kali Anyar. The Open Street Map-Based mapping scheme is conducted in kampong mapping pattern along the banks of Kali Pepe Surakarta. Based on the working scheme, the learning process attempts to produce the river and urban kampong-based knowledge. The attempt of documenting the rivers together with the locals becomes the basis of producing knowledge on the kampong and city. The process of documenting the non-physical aspect of river including history, experience, adaptation pattern, and expectation related to river management is the material studied here.

The physical aspect of river is documented as the mechanism to explore knowledge together with the citizen, including: river condition, waste, deposition, infrastructure and public facilities existing. The primary data used was obtained using in-depth interview with informant in the field, particularly related to individual's various experiences with the dynamics of city, kampong and river around their residence.

Considering such the condition, the process of documenting kampong and river conducted develops in some stages: starting from building access, brainstorming along with the representatives of citizen, documentation process, writing to broader publication attempt. These stages are coupled gradually, starting with joint mediation between youth and the representative of society leaders. From the opening of access, brainstorming process enables the citizen to understand better the agenda designed by youths and citizen more openly to receive the youths' coming.

Documentation process was conducted by arranging the visit schedule, before which instrument had been developed. The instrument developed was the attempt to explore more in-depth some urban issues existing, consisting of: what the history of kampong is and how the river is defined by citizen, how the social-cultural process and dynamic develop in kampong and various changes occurring to be documented later. The daily

condition of kampong people's activity was elaborated to be the material of documentation that should be recorded in recording, note, photograph, and sketch.

3. Results and Discussion

Indonesian River Congress's Report mentioned that currently 52 rivers are polluted, 80% of river condition is damaged, 15 of which play an important role for irrigation and drinking water, are in critical condition [3]. As a result, the condition of urban rivers has decreased in its supportability of the increased need of society. Continuous environment degradation does not only impact on the public health but also potentially results in social conflict [11].

Recently, the condition of rivers in Surakarta City, particularly Kali Pepe and Kali Jenes, is very worrying. The water formerly flowed smoothly and cleanly. Today, it looks dirty and murky, even in some points, no water flows. The standard quality of water along Kali Pepe's stream is contaminated with waste. The flow rate in the rivers is lower leading to the gap between rainy and dry seasons. In addition, it leads to the decreased water reserve and the high sedimentation rate. Therefore, flood occurs in rainy season and drought in dry season [1].

Kali Pepe looks like a rubbish gutter in the center of city. There has been no sense of belonging to Kali Pepe among the members of society. Both solid and liquid factory and domestic wastes are disposed to the river. Thus, Kali Pepe is currently full of waste and emits a bad odor. This condition has occurred for a long time, but the government only conducts dredging process that according to the members of society have worsened the condition of the river.

It is imperative that mapping the non-physical aspect of river, including history, experience, adaptation pattern, and expectation related to river management be developed to engage the public in helping save the rivers. In addition to nonphysical aspect, physical aspect of river is documented as the mechanism to explore knowledge along with the citizen, including: river condition, waste, deposition, infrastructure and public facilities existing [5].

After documentation process is completed, the Open Street Map-based mapping program can be developed. Open Street Map (OSM) is the project of developing a free-editing world map. Two main activators behind the OSM pioneering and growth are limited use and availability of map information in some areas in the world and the proliferation of affordable portable satellite navigation set. OSM is facilitated with JAVA Open Street Map (JOSM) Editor software in its editing process. The case of Kali Pepe mapping using Open Street Map (OSM) is the first project using this application in Surakarta. Through OSM mapping that is opened and can be edited by everyone gives kampong people the opportunity of seeing and editing the existing data themselves.

The people can function as the informant and permanent evaluator all at once, so that the information built is dynamic.

Inoguchi et al [4] confirmed that partnership framework in environment-oriented development should be constructive in nature in developing agenda and action plan comprehensively to reduce the urban environment-related problems. The key to this effective action is to collect the actors and users of urban development, including government and non-government, by keeping appreciating their own weakness and strength in order to solve the existing urban environment problem in synergy.

In the mapping using Open Street Map, the following are the work process of building data collection and inputting into Open Street Map application: (1) The mapping process conducted here is intended to validate the satellite image taken in field paper. This field paper becomes the mapper's guidelines to validate the building and the road to be mapped later. (2) The process is conducted by drawing building or road based on the fact in the field. In addition to drawing it, the mapper also records the description of building or road. It started from the type of building, the number of floor, and etc, to support the completeness of data in open street map. (3) Then, the mapping process is conducted by inputting data into Open Street Map application that can be done online or off line [9].

The mapping of Kali Pepe starts from the people's houses in order to find out exactly the number of buildings occupying the river flow. The condition of buildings such as roof condition, floor and wall number is recorded in Open Street Map-based mapping. From the data, the typical pattern of settlement along the river flow is mapped. In addition to houses, the buildings we mapped include community hall or public places for the community socialization. It is important, because it can be found the point where the members of society assemble thereby when an event will be held or when the disaster occurs, it will be found where they should assemble. This assembling point will be the magnet to which many people come without invitation. We can map the permanent building, but we cannot do so to the often-moving small stalls.

The Open Street Map application is then distributed to the members of society, recalling the existence of citizen as the primary basis of knowledge about city, kampong and river. The citizen will understand better its kampong's relationship with the river through the map in Open Street Map. Just like the community's knowledge on facility existing in its area, for example the presence of public spaces or other facilities in which the citizen can utilize it as the assembling place.

The data collected during this mapping will be built and gathered along with the community to update information and its knowledge. Through involving the community in building or developing the map of their own areas, it is expected to generate their sensitivity to the area where they live. Recognizing the field situation, they will realize their potency and their need for the area where they live.

An environment-oriented development is a conscious planned attempt of using and managing resource wisely in a sustainable development to improve the quality of life. It is because city is the arena of complex human activities involving a variety of activity aspects, including human being, natural and man-made resources; for that reason, a partnership is required to maintain it. Seregaldin (1995) emphasized that making the city developing continuously and sustainably is to ensure the improvement of the urban people's life quality and the comfort of other urban people

The distributing scheme is then designed in some approaches, from building the network with community, and designing some mural, comic, disaster response and waste workshops to producing documentary movie of kampong diary and OSM mapping result. The working series to distribute much knowledge explored in the river and kampong become the material to be developed as the form of response to the existing change by the members of community. It can be the scheme to distribute the previously acquired knowledge as well. A series of workshop was held to discuss the condition of city, kampong and river. Some agendas are also designed to respond to the condition based on the yielded knowledge.

Meanwhile, other elements include the campaign to distribute the knowledge on mapping process in Kali Pepe area. The campaign is made to give information to the members of community concerning the awareness of spaces where they live. The knowledge on the spatial consciousness becomes important to make the members of community capable and having capacity to respond to various existing changes. The result of workshop "drawing along with children" is one illustration of the kampong future. The important message to the community is to arrange the community's direction and orientation to change in the future.

Every activity becomes a medium to get the kampong closer to the public, particularly the wider youth community or the kampong settlers. Hastag #MemetriKali becomes one strategy of using social media and the most reasonable choice because it will be more accessible and managed more easily by the youth at the same time. So far, the utilization of social media has run well, in which many activities in the kampong can be documented and updated directly. The feedback of social media use is the interactive content built, both from the administrator managing the media and from the audience following the updated material.

All of contents are the attempt of distributing the kampong issue in order to be a broader issue with dissemination using hashtag <http://kampungnesia.org>; <http://youtube/kampungnesia>; <http://facebook/kampungnesia>; <http://twitter@kampungnesia>; <http://instagram@kampungnesia>. A variety of information dynamics through social media can be the information bridge managed actively by many stakeholders. From administrator side, the shared information is the primary one obtained directly; and from audience side, the public's response becomes information material

that can also be distributed and originate from the official online media raising the kampung issues and enabling the distribution of its information through social media. From all of those processes, the content of change with any transformation existing within it, from the transformation of city both in physical aspect due to investment and in non-physical one due to the community's need and its implication to the river is conceived as the result of knowledge production by and along with the members of community.

4. Conclusion and Recommendation

The changing city dynamics due to development has diverse consequences. Those consequences are, among others, lost public space due to the presence of diverse city's commercial interest. City commercialization can be seen from the kampung and changing river conditions due to changes in the city over the last two to three decades. The increased number of population leads to the increased need for clean water. Meanwhile, the condition of river as one of clean water sources is polluted due to both domestic and large-scale industrial waste disposal.

The challenge for environment-oriented development is the conscious and planned attempt of using and managing resource wisely in a sustainable way in order to improve the quality of life both in the city and the kampung. The joint commitment should be confirmed as the starting point to build city, kampung and river to be the better one. Partnership offering becomes important in environment-oriented city development and in the attempt of involving the community in environment and natural resource management. The opening of participation rooms for the urban community to be involved in the city changing scheme is important. However, the more important thing in participation process is the urban people's knowledge on their city. To create imagination about the change of city, kampung and river are built by the urban community for their future.

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