

Strategic Thinking to Change Behavior and Improve Sanitation in Jodipan and Kesatrian, Malang, East Java, Indonesia

Prasanti Widyasih Sarli, Prayatni Soewondo

Abstract—Greater access to sanitation in developing countries is urgent. However even though sanitation is crucial, overall budget for sanitation is limited. With this budget limitation, it is important to (1) allocate resources strategically to maximize impact and (2) take into account communal agency to potentially be a source for sanitation improvements. The Jodipan and Kesatrian Project in Malang, Indonesia is an interesting alternative for solving the sanitation problem in which resources were allocated strategically and communal agency was also observed. Although the projects initial goal was only to improve visually the situation in the slums, it became a new tourist destination, and the economic benefit that came with it had an effect also on the change of behavior of the residents and the government towards sanitation. It also grew from only including the Kesatrian Village to expanding to the Jodipan Village in the course of less than a year. To investigate the success of this project, in this paper a descriptive model will be used and data will be drawn from intensive interviews with the initiators of the project, residents affected by the project and government officials. In this research it is argued that three points mark the success of the project: (1) the strategic initial impact due to choice of location, (2) the influx of tourists that triggered behavioral change among residents and, (3) the direct economic impact which ensured its sustainability and growth by gaining government officials support and attention for more public spending in the area for slum development and sanitation improvement.

Keywords—Behavior change, sanitation, slum, strategic thinking.

I. INTRODUCTION

ACCCESS to sanitation, in the form of both solid waste or wastewater treatment facilities, in developing countries is urgent. In the urban setting this urgency is amplified due to the population density that increases the complexities of sanitation problems.

In general, urban areas have better sanitation facilities than in rural areas. Of the 1.9 billion people who gained access to improved sanitation between 1990-2011, 1.1 billion live in urban areas. However even these urban areas are struggling to keep up with the urban population growth [10]. Rapid urbanisation in developing countries creates massive demand for basic infrastructure in cities. As a result infrastructure development lags behind the population growth especially in low income areas [9].

In Indonesia, about 53.7% of the population live in urban areas [2], and of the 59% of the Indonesian population

P. W. Sarli is with the Department of Civil Engineering, Faculty of Civil and Environmental Engineering, Institute of Technology Bandung, Indonesia (e-mail: prasanti.wsarli@yahoo.com).

P. Soewondo is with the Department of Environmental Engineering, Faculty of Civil and Environmental Engineering, Institute of Technology Bandung, Indonesia (e-mail: prayatnisoe@yahoo.com).

that has adequate access to sanitation facilities [3], 59.2% live in urban setting [1]. Solid waste-collecting systems are uncommon; in 2008 the waste management authority served only 56% of the population [7], [5]. Also at this moment only 2% of the population has access to off-site system of domestic wastewater treatment facilities, while 50% use on-site system, leaving the rest struggle with open defecation or other unsanitary practices.

The Indonesian government is dedicated in improving the sanitation level by having a target of 100% access to sanitation and complete eradication of slums by the year 2019 [7]. However in reality it is estimated that less than 2% of the national and regional budget in Indonesia goes into sanitation. Therefore sanitation facilities cannot operate in its full capacity due to lack of operational and maintenance budget [3]. With this monetary limitation, it is important to (1) allocate resources strategically to maximize impact and (2) take into account communal agency as a valid potential to pull the sanitation problems out of its current situation.

The Jodipan and Ksatrian Project in Malang is an interesting model for solving the sanitation problem. Although the projects initial goal was to create a new tourist destination by painting parts of the slum area with bright colors, it quickly had an effect also to the change of behavior of the residents and the government towards sanitation. Although further research into Jodipan and Ksatrian project showed that improved awareness in waste management is not an entry point to improve wastewater management awareness [6], but the success in changing behaviour and increasing the awareness on residents towards solid waste management is still observed. In fact there is a significant reduction of residents who litter directly into the river after the visual improvements, with a total reduction at 22% [8]. In this research the success of Jodipan is investigated and the components of the project identified.

II. METHODOLOGY

In order to identify the components that resulted in the success of Jodipan and Ksatrian, in this research a descriptive model is used to investigate in depth the nature and timeline of the project. The descriptive model is build by using data from

- 1) Expert interview with stakeholders related to the project, which include
 - a) Representative of the company who is the fund giver of the Community Service and

Rresponsibility (CSR) Project that resulted in the Jodipan and Ksatrian program, PT Indana

- b) Students who are the initiators of the project
 - c) Academic Lecturer from University of Muhammadiyah Malang who was the supervisor of the students during the project
 - d) Head of the Community
- 2) Preliminary survey to gather qualitative data of the residents which was done before the visual improvement project
 - 3) Quantitative survey of both the residents of Jodipan and Ksatrian was performed. From this data the sanitation status as well as residents preference for improved sanitation and the initial economic set up with the economic impact the project has given is investigated.

Further details on the methodology used in this research is given in the subsequent sections

A. Data Collection

Questionnaire were used to collect qualitative data and they were administered between February to April 2017. The questionnaires were formulated to collect data from households residing in the area of study. The sampling of households was random and questionnaires were administered to a total of 117 households, 48 household in Jodipan and 69 households in Ksatrian (see Fig. I for summary). This sample size was considered representative, with a margin of error calculated by using the Slovin Method of only 1 %, the appropriate sample size was calculated as follows

$$n = \frac{N}{1 + Ne^2} \quad (1)$$

Where n is the sample size, N is the population size and e is the error margin.

The questionnaire itself is designed to capture these following information

- 1) demographic aspects
- 2) socio-cultural and socioeconomic aspects
- 3) attitude towards solid-waste management
- 4) sanitation facility preferences
- 5) water supply sources
- 6) sanitation facilities currently in use

B. Data Analysis

The data collected through the questionnaires from residents was analyzed using SPSS and MS Microsoft Excel. Simple statistics were used to investigate the demographics, economic impact and behaviour change of residents.

III. DESCRIPTION OF THE JODIPAN AND KSATRIAN PROJECT, MALANG

The description of the project is obtained mainly by using the qualitative data from expert interview mentioned in the methodology. The description of project below that also include the timeline of the project which will also be used to analyze the components that resulted in the success of the project.

A. Area Description

Jodipan and Ksatrian are two Administrative Villages (Kelurahan) in the area of Bllimbing, Malang, East Java, Indonesia (see Fig. 1 for clarity, Malang is the city marked with a red dot). A small part of both of these Kelurahan are located around the riverside of Brantas River, these areas are considered illegal neighborhoods, according to the Government Order PP 2011 on rivers, the residents however have been occupying the area for more than 30 years.

TABLE I
 RESEARCH AREA DATA

Area name	Jodipan	Ksatrian
Population	91 household	220 households
Sample Size	48 household	69 households

Preliminary research done before the project found that 90% of the residents of Jodipan throw away their trash directly into the river, the reason being that 1) the distance to the nearest temporary garbage disposal is significantly far, while the river is nearby, 2) resident do not think that their action affects the rivers overflow, stating that the flooding of the river is due to the activities upstream of the river.

B. Project Description

The project can be separated by timeline to two segments of Jodipan and Ksatrian, below the detailed description for each is given.

1) *Jodipan Area:* In Februari 2016, a group of students from the Communication Department of Muhammadiyah Malang University initiated a project to paint parts of the Jodipan area with bright colors. The students collaborated with PT Indana, a local company in Malang, to receive help in the form of the paint and funding. PT. Indana welcomed the students initiative and used the project as a Corporate Social Responsibility platform for their brand Decofresh. The project, title "*Decofresh Mewarnai Jodipan*" or "*Decofresh Colouring Jodipan*", was initiated as part of a Public Relations Class. Its affiliation with an ongoing class, gave a one semester time frame for the completion of the project, starting from February to June 2017, although in reality the project was officially completed in September.

The Projects main purpose is to fulfill the duty of the Public Relations CSR of the company. The project needed to fulfill the triple bottom line of CSR, which stressed the company's action to focus on the sustainable impact of the project economically, socially and environmentally. Both the students and the company designed the project not to only help the residents, but also as a tool for better public recognition for the company. Therefore the choice of the location became crucial.

In Malang, there are 26 areas that are considered to be slums, but most of them are not visible from the main street, resulting in a smaller impact for the company if those areas were to be chosen for the project. Jodipan therefore became a convenient choice due to its visibility from one of the main streets in Malang and its scenic position. The area was particularly chosen for its visibility from the Gatot Subroto

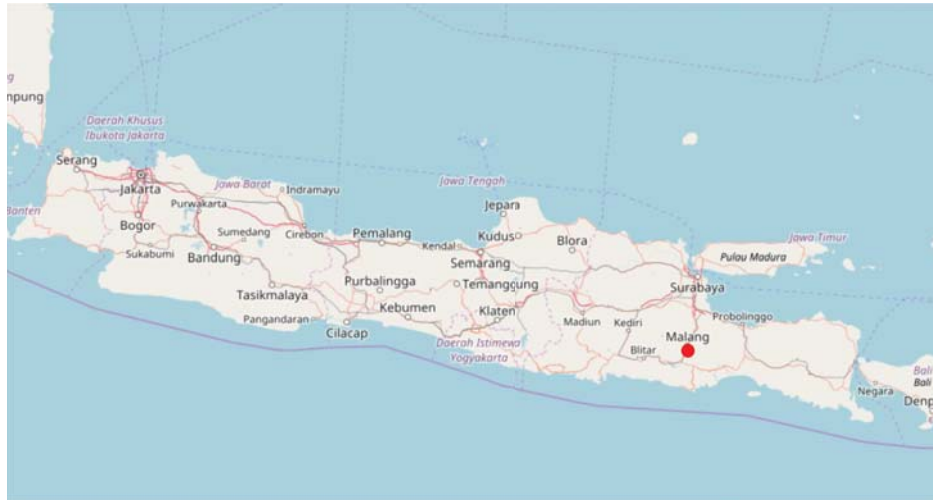


Fig. 1 Malang is a city located at the Eastern part of Java Island

Bridge, so that it can become a good viewpoint for the public who is passing by. Additional consideration in favor for Jodipan was the clear view of the rail-line bridge from the viewpoint, which increased the visual appeal of the area (see Fig. 2 for clarity).

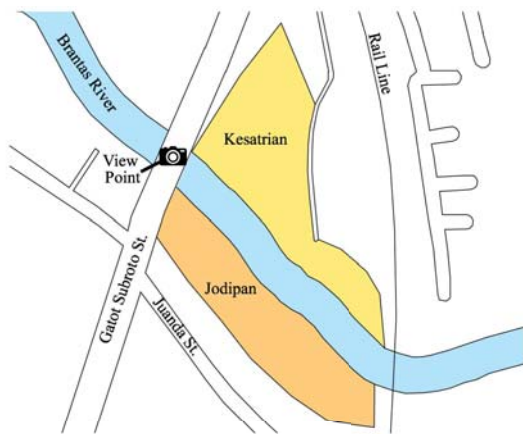


Fig. 2 Map of the Jodipan Project

The residents were then given 15 choices of colors to choose from for their respective houses. The students collaborated with the local residents, military officers, and also workers from the company to paint the neighborhood. Local Mural Artist communities were also called upon to decorate the neighborhood.

Since this was a project part of the public relations class, the success of the project was also measured by the amount of publicity it received. By the end of the painting, the project already received 8 features in local newspapers, and also was featured by accounts on social media. This increased the hype of the project for local tourist, so that the influx of the tourist increased dramatically.

Other than the visual changes, in Jodipan Village the project also brought a new solid waste collecting system for



(a) Before (from the Guys Pro documentation)



(b) After

Fig. 3 The view of Jodipan and Ksatrian from the bridge viewpoint

the neighborhood, which uses the entrance money of 2,000 IDR paid by tourists to enter the neighborhood. The new system helped change residents behavior that was used to litter directly into the river. In this new system, the community

arranges for a garbage collection system from the trash bin in front of their house to the temporary garbage disposal area, and also they can make payment for the collection of their garbage from that temporary garbage disposal area to the landfill. Since the trash bin now is in front of their houses, it became more convenient than throwing the trash directly to the river. With the earned money, the residents are also planning on building new toilets to facilitate the coming tourists.

2) *Ksatrian Area*: During the official opening of the Jodipan Project to the public that was attended by both the high officials from the company and the local government on 4th September 2016, the Mayor of Malang ,H. Mochammad Anton, requested to PT. Indana to extend the visual improvements project to the neighboring village, Ksatrian (colored in yellow in Fig. 2).

This then started the continuation of the project to include the Ksatrian village of 220 households that was completed by November 2016. The completed transformation of both Jodipan and Ksatrian can be seen in Fig. 3, where Ksatrian is on the left side and Jodipan is on the right side, the picture is taken exactly the viewpoint from the bridge on above the two villages.

C. Response after the Project

The city government officials have recently established the area as an official tourist attraction, despite it formerly being constantly susceptible to eviction before the project. In 2017, the local government have requested PT Indana to build a pedestrian bridge from Jodipan to Kesatrian in an effort to increase the neighborhood's attractiveness for tourists.

The city government also has realized the potential of urban areas to become tourist attractions if development and therefore in late 2016 they have launched a "Thematic Villae Competition", where all 57 Kelurahan in Malang are requested to team up with university representatives or professionals to come up with a proposal to improve their Kelurahan. The three best proposals will then be given the requested budget for the year 2017 by the local government.

The city government has also teamed up with PT Indana again to create other themed villages in Malang, yet again visually improving less prominent neighborhoods. These villages include Kampung Putih or White Village and a blue themed Kampung Arema.

The impact of the Color Village also extends beyond the city of Malang, with several other slum areas in different cities requesting visual improvement help from PT Indana. These areas include the Gang Dolly area in Surabaya and Sindulang, Manado. Other projects not affiliated with PT Indana but was inspired by this project include the Kampung Pelangi Project in Semarang, Central Java.

IV. RESULTS AND DISCUSSION

In this section the results and discussion of the research is presented. Firstly the area demographics are presented to give context to the results, then the economic impact of the project is elaborated and the change of behaviour of the residents is then presented. The strategic thinking of the project is then discussed.

A. Area Demographic

The questionnaire distributed at the area shows the demographic of the residents. Both in Jodipan and Kesatrian, the majority of the residents have lived in the area for more than 10 years, with 88% in Jodipan and 93% in Kesatrian. Most of the residents also claim to own their property with 88% in Jodipan and 100% in Ksatrian, despite the area legally owned by the state.

The residents have an educational level above the national average, with the majority of the residents being graduates from Senior High School, 56% in Jodipan and 46% in Ksatrian. In context the national average only has 34.27% of the population as graduates from Senior High School [4].

Based on the poverty line by the National Statistic Body, a household in Indonesia is considered living in poverty when they earl less than 45 USD per month [4]. The questionnaire shows that 15% of the residents and 3% of the residents are living below that poverty line, while the majority of the residents of about 67% earn between 75-225 USD per month. However since most of the residents are self-employed, incomes are unstable, making even the best earning households susceptible to fragile economic situations.

B. Economic Impact of the Project

The economic impact to the area are in the form of the economic impact to the community and to the individuals. To the community the direct impact is in the form of entrance ticket that is paid by the incoming tourist. During weekdays an average of 200 visitors per day come into the village, while during the weekends on average 800 visitor come, bringing in a total 1,620 USD per month to the village. The incoming money is then used to pay for the waste management system in Jodipan, where the community now employs one resident to collect garbage directly from residents houses on a daily basis, and communal activities in both Jodipan and Ksatrian.

To the individual the economic impact can be classified as direct and indirect income. The direct income consist of added income that is obtained by households in which a family member works at the entrance ticketing counter, 46% residents in Jodipan and 25% residents in Ksatrian receive direct income due to this project (see Fig. 4). With the majority (55%) of these residents earning an additional 30-90 USD per month in Jodipan and 76% in Ksatrian earning an additional 90-150 USD per month (see Fig. 5 for more details). The difference in direct income is due to the difference of working hour spent on the entrance ticketing counter and also the days in which the individual receives their schedule duty. Individual working on weekends have bigger income than the ones working on weekdays, creating micro conflicts among residents about who has the right to the more lucrative schedules.

The indirect income comes with the benefit to residents who opened business or shops after the project at their houses because of the influx of tourist. 31% residents in Jodipan and 13% residents in Ksatrian claim to have opened new businesses after the project. In Jodipan, among the households that have businesses, 50% claim to receive an additional 22.5-52.5 USD per month through their business, while in

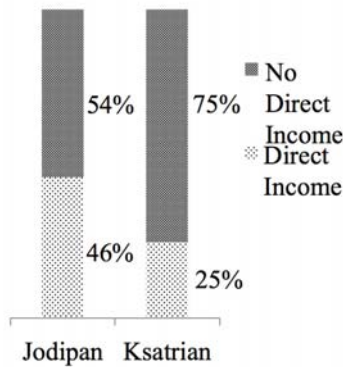


Fig. 4 Percentage of residents at Jodipan and Ksatrian who receive direct income from the project in the form of jobs as entrance ticket sellers

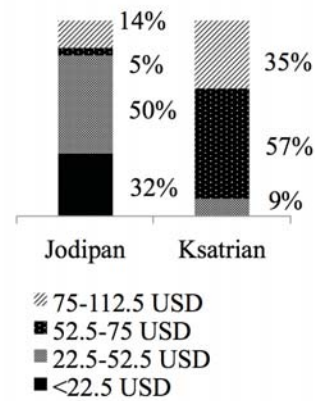


Fig. 7 Residents income from the businesses they are running in Jodipan and Ksatrian

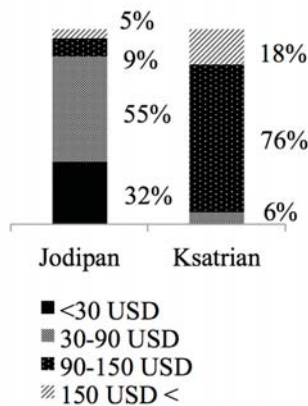


Fig. 5 Direct income received by residence directly by working at the entrance ticketing counter per month

Ksatrian 57% of the business owning households claim to make additional 52.5-75 USD per month.

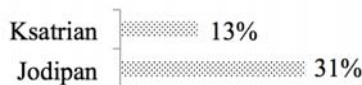


Fig. 6 Percentage of residents opening new businesses after the project in Jodipan and Ksatrian

C. Change in Littering Behaviour among Residents

The change in behaviour on littering directly into the river due to the project is significant especially in Jodipan where there is a 31% reduction of littering, while in Ksatrian the reduction is only at 7%. The reason for the significant difference is that in Jodipan before the project there was no waste management system in place, whereas in Ksatrian the system was already there. In turn the income for the community that is obtained from the entrance ticket is used to fund a waste management system in Jodipan that collects waste directly to the residents houses, which significantly reduces their need to litter into the river. The change of this

behaviour results in the reduction of 1.1212 L/household/day trash thrown directly into the river in Jodipan 0.1524 L/household/day in Ksatrian.

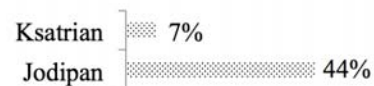


Fig. 8 Reduction of littering behaviour in Jodipan and Ksatrian

D. Strategic Thinking of the Jodipan and Kesatrian Project

Unlike other projects that deals with behaviour change to improve sanitation through education of residents, this project simply improves the area visually through changing its colors, however it succeeded in changing the behaviour of the residents. This is because the project gave residents economic benefits, and therefore solidifies the need for a cleaner environment to maintain the influx of tourists to their area. At the same time the added tourist area is also beneficial to the local government that there is incentive to replicate the project in different areas of the city. Other local governments also take note and take lead in making their own version of color village in their respective area.

This paper argues that the reason for the success is the initial choice of location of the project that is able to attract tourist and also the media attention given to the project created the necessary condition to attract public attention. The increasing numbers of tourist visiting the area resulted in economic benefit to the residents that ensured the sustainability of the project.

This shows that the goal of having sustainable sanitation facilities in lower income neighborhoods and slums can be obtained through an approach that is not straight forward. By giving economic benefit both at the residential and local government level, this simple project is able to solidify the benefits of a cleaner environment and change behaviour at the residential and governmental level to the importance of a cleaner environment and sanitation facilities.

V. CONCLUSION

Often times not much resources is available for the complete structural change necessary to improve sanitation. In this research, the importance of strategic thinking in maximizing impact is discussed. The Jodipan and Kesatrian Project illustrated the importance of having clear visible changes to raise morale and interest for the possibility of further changes.

The success of the project was marked by

- 1) the strategic initial impact due to choice of location which gathered public attention easier
- 2) media attention that created the hype that resulted in the influx of tourists that triggered behavioral change among residents
- 3) the direct economic impact which ensured its sustainability and growth by gaining government officials support and attention for more public spending in the area for sanitation purposes.

This paper argues that based on the Jodipan and Ksatrian project, in order to achieve sustainable and widely accepted improvement in sanitation especially for lower income neighborhoods, a project should have direct or indirect economic impact to the community. The economic benefit will then ensure the involvement of all related partners.

VI. FURTHER WORK

The Jodipan and Kesatrian Project in Malang, East Java Indonesia showed the possibility of improving sanitation facilities by using alternative approach through strategic thinking, however it would be desirable to see whether similar results can be seen at different projects that also use alternative approach such as visual improvements.

ACKNOWLEDGMENT

The Authors would like to extend gratitude towards the Research, Community Development and Study Group Innovation Program 2017 (*Program Penelitian, Pengabdian Masyarakat dan Inovasi Kelompok Keahlian - P3MI*) of Institute Technology of Bandung (ITB) for funding this research. The study was carried out with the help of the water and wastewater engineering study group of the Faculty of Civil and Environmental Engineering ITB. The cooperation of Guys Pro, PT Indana and Mr. Jamroji as lecturer from University of Muhammadiyah Malang is also greatly appreciated.

REFERENCES

- [1] ADB. Sector Assesment (Summary):Sanitation, Urban Sanitation and Rural Infrastructure Support to the PNPM Mandiri Project (RRP INO 43255-01). Technical report, ADB, 2009.
- [2] Central Investigation Agency. The World Factbook.
- [3] UN-Water Global Analysis, Assessment of Sanitation, and Drinking Water. Progress on Drinking Water and Sanitation, Country Highlights:Indonesia. Technical report, WHO, 2015.
- [4] Badan Pusat Statistik.
- [5] Badan Perencanaan Pembangunan Nasional. Rencana Pembangunan Jangka Menengah Nasional 2015-2019. Technical report, Presiden Republik Indonesia, 2014.

- [6] Prayatni Soewondo Nida Maisa Zakiyya, Prasanti Widyasih Sarli. Non Linear Relationship Between Change in Awareness in Municipal Solid Waste Management And Domestic Wastewater Management ? A Case of the Jodipanand Ksatrian Village, Malang, East Java). In *International Conference on Construction and Building Engineering (ICONBUILD 2017)*, August 2017.
- [7] State Ministry of Environment. Indonesian Solid Waste Statistics. Technical report, The Republic of Indonesia, 2008.
- [8] Prayatni Soewondo Prasanti Widyasih Sarli, Nida Maisa Zakiyya. Correlation Between Visual Improvement and Behavior Change of Municipal Solid Waste Management in Jodipan and Ksatrian Village, Indonesia). In *Proceeding of Regional Conference in Civil Engineering (RCCE) and The Third International Conference on Civil Engineering Research (ICCER)*, August 2017.
- [9] M.A.C. Schouten and R.W. Mathenge. Communal sanitation alternatives for slums: a case study of Kibera, Kenya. *Physics and Chemistry of the Earth*, 35:815–822, 2010.
- [10] WHO and UNICEF (Joint Monitoring Program). Progress on Sanitation and Drinking-Water: 2013 Update. Technical report, WHO and UNICEF, 2013.