

# The Development of River School as a Community Empowerment Facility at Tegaltirto, Berbah, Sleman Regency

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**Abstract** A river as one of the providers and buffers of life must always be preserved. The sustainability of the river ecosystem is necessary so that water availability can be maintained over time both in quantity and quality. Attention to community behavior is the main target to guarantee the conservation of river water. River pollutants are increasing in quantity due to both domestic and production activities. Community empowerment aspect should always be improved especially in taking care of maintenance and utilization sustainability of the river for human life in particular and ecosystem in general. Tegaltirto Village which is crossed by the Opak River is very important to be preserved especially in proper river management. Community service in the form of institutional development of river school is needed. The scheme is appropriate to educate, assist, and initiate a proper and sustainable community empowerment forum.

The research methods in the empowerment of a river school institution are focused on the participatory empowerment aspect. Data collection was done through interviews, documentation, and focus group discussions. The knowledge and skills of the river school institution are transferred through training and an intensive facilitation program. The preparation of the follow-up plan was done through assistance by UGM Team. This was to realize the organizational structure that was responsible for the management and utilization of river resources.

The implementation of a river school institution in Tegaltirto Village cannot be separated from the community participation and the observer of river conservation in the spirit of building the village. Conservation and sustainability of water and river utilization become the implementation motivation for the river school activity in Tegaltirto village.

## 1. INTRODUCTION

This article explains the importance of developing a river conservation culture through a river school institution in Opak's watershed, particularly at Tegaltirto Village, Berbah District, Sleman Regency.

The Opak River is one of the major rivers in DIY (Yogyakarta Special Region), which has an essential role in ensuring water availability, especially in Sleman and Bantul Regency. There are 5 districts in Sleman Regency through which the Opak River flows, one of

which is Berbah District (BSDA DIY, 2017). The area, through which the river passes, has many advantages because the river plays a strategic role as a source of life.

The role of rivers is as a water balancer in an area (Gunawan *et.al*, 2005). The river provides economic value, fulfilling household water demands. Rivers can be used for agricultural irrigation, fish farming, transportation, and tourism (Muchlashin, 2019). A river is a flood barrier and a place for recreation (Angelia, 2014). The river can also be a place for water sports. The discharge of the Opak River is 0.12 m<sup>3</sup>/second (Aplikasi Dataku DIY, 2019). However, unlike in the upstream area, Tegaltirto Village, Berbah District, is positioned in the middle, so that it receives a lot of polluted the Opak River's water.

The Opak River has the water quality of the Opak River estuary; the ammonia parameters range from 0.02-0.06 mg/L; the nitrate parameters range from 0.34-0.81 mg/L; the phosphate parameters range from 0.06-0.46 mg/L, and total coliform is 30,825 colonies/100mL. The Opak River has concentrations of Pb, Cd, Fe, and Mn metals of 0.038-0.107 mg/L, 0.009-0.011 mg/L, 0.03-0.18 mg/L, and 0.0001-0.0012 mg/L (Ahram, 2019). Some of the problems with the Opak River are reduced vegetation due to eruptions (Febriyanto, 2016), flooding, erosion, and the supply of sediment from Mount Merapi, which has changed its morphology (Wardhana, 2015). On the other hand, excessive mining of sand and stone has destroyed its morphology, and its water has been polluted. This condition shows that the quality status of the Opak River estuary is moderately polluted.

Erosion, flooding, abrasion, shrinkage of water discharge, and sedimentation have affected the river's channel, cliffs, and riverbanks. Based on the sediment transport simulation for 365 days, the upstream sediment reaches 515,519 tons; the middle sediment reaches approximately 79,282 tons, and the lower reaches 47,300 tons. This quantity is larger than that of the Winongo River that is 36,231 tons and the Oyo River that is 29,437 tons (Wardhana, 2015). Research conducted by (Khotimah and Respati, 2010) adds that the decline in water quality and sedimentation occurred in rivers that flow from springs Mount Merapi.

Other problems faced by the Opak River are the garbage that gets stuck in the roots of plants on its cliffs and the rubbish that is piled up in its watershed, making the river's mouth full of garbage. As stated by Wardhana (2015), the drifting away trash from the upstream of the river sometimes gets stuck in the estuary area. In particular, this problem cannot be separated from people's awareness and behavior in managing waste independently.

The watersheds (DAS), areas through which the Opak River flows, must always be maintained to

protect the better sustainability of the ecosystem. The river preservation does not only require government policy schemes but also the community's participation that actively works along the river. The community behavior on the river that is a valuable asset has to be activated proportionally.

Historically, the government has been designed and implemented several policies to initiate programs to control river water pollution. Program Kali Bersih (Prokasih) is the clean river government program that really cares about the environment. Prokasih is an interesting example of overcoming river pollution. Several government policies are the Circular Number: 05/SE/D/2016 on guidelines for the maintenance of river infrastructure and facilities as well as river maintenance, the Regulation of the Minister of Public Works No. 49/PRT/1990 on Procedures and Requirements for Permits to Use Water or Water Sources, the Regulation of the Minister of Public Works No. 63/PRT/1993 on River Boundaries, River Benefit Areas, River, and Former River Mastery Areas, the Regulation of the Minister of Public Works No. 11A/PRT/2000 on Criteria for Distribution of WS. Recently, river communities have emerged and are committed to preserving rivers. Indeed, some communities get involved in developing the river as a water tourism destination that is attractive, fun, and generates income generating.

Several action programs on the river estuary rescue implemented concern the Opak River that includes the Baros mangrove area in the estuary. It was developed by Relung, an NGO, in collaboration with the Baros Youth Organization (BYO) supported by several agencies as a real action of river estuary rescue (Ardiyansari, *et.al*. 2019). Recently, Baros has been both a mangrove management sub-village and the owner of the area. A tremendous positive impact resulted from the development of a mangrove area at the mouth of the Opak River; it was the reduced level of abrasion at the Opak River's estuary.

The culture and behavior of the riverbank community are not in line with the idealism of river conservation. Sangalang and Adji (2014) state that the condition of the riverbank area is getting shallower and narrower due to sedimentation. Tegaltirto Village, as a part of the Berbah District of Sleman Regency, is fed by the Opak River with a relatively high-water flow throughout the year. The community does not realize that the Opak River is very beneficial for Tegaltirto Village. Since the community's knowledge of the existence of the river is relatively minimum, the living behavior does not yet support the idea of river conservation. Most villagers throw garbage in the river, mine sand and rock without heeding safe mining boundaries, and use watershed for interests that violate regulations. Some facts can be identified in Figure 1.



**Figure 1.** The environmental situation of the Opak River at Tegaltirto, Berbah, Source: Field survey documentation, 2017

Along with decreasing appreciation of local values in *merti kali* (caring for and protecting rivers), the frequency for cooperation decreases, and the concern for rivers were not manifested. Based on the explanation from the village head, despite the “Kali Community” growth in 2015, it has only focused on the Kuning River.

The gap presented in this article is that when the river's existence and role are needed, the quality of the Opak River has decreased, and the river maintenance program is limited and the culture of *merti kali* is almost extinct. To provide a solution, this article raises the problem of how to empower the community through the development of a river school to promote and facilitate the community to become river conservationists.

Meanwhile, the awareness of the importance to care for and protect this river only grows in limited circles. To raise public awareness in a broad sense, an institution is highly needed. In response to this need, an idea of community service is developed with the Environmental Sustainable Development (ESD) program that is the development of a river school institution as a forum for community empowerment to positively manage rivers.

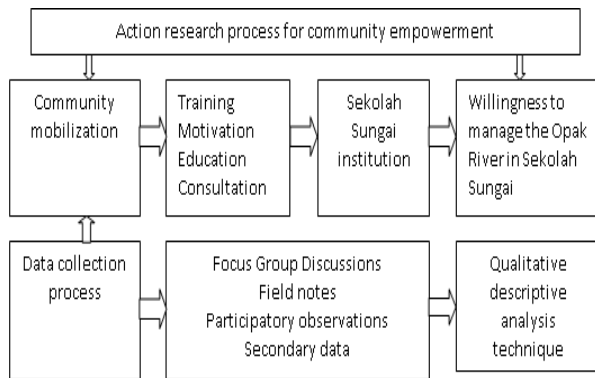
Since the limited capacity of the community and the low awareness of protecting the river, especially in Tegaltirto Village that is a part of the Opak River's watershed area, a strategic step is needed to initiate river conservation. Therefore, the community service aims 1) to build a river school as a systematic approach in empowering the community to behave positively towards rivers and 2) to provide training for the community in the importance of riverbank. These are urgent to provide provision and dissemination of the importance of river ecosystems in the context of protecting the environment in general and extending public awareness of the existence of rivers.

In other words, this community service contributes by establishing a river school institution as a forum for river conservation activities. Another contribution is promoting the change in people's attitudes and behavior, from ignorance to awareness of the river.

## 2. METHOD

The community service was conducted in 7 months from April to October 2017. This program was conducted in Tegaltirto Village, Berbah District, Sleman Regency, Yogyakarta, Special Region.

The community service focused on the establishment of *Sekolah Sungai* (river school) institution as a forum for community empowerment. This program was action research and implemented in the form of education, training, motivation, and consultations. The training was conducted to provide knowledge transformation, especially in river management, in the institutional context of the river school. The motivation session was carried out to raise community enthusiasm to stimulate their interest and willingness to manage the Opak River in an institutionalized and organized manner in the river school. The education was carried out extensively targeting the community to explain the importance of being responsible for the river environment, as well as encouraging that they should play an active role in the river management. The consultations were carried out by providing a space for dialogues and discussions on various challenges and constraints faced in the institutionalization of the river school.



**Figure 2.** The action research process framework

As shown in figure 2 this action research carries out a series of work steps. The team's first step was mobilizing the community, to be given training, motivation, education and consultation. The second step of the team was to provide community assistance to build a river school institution. The third step is that the river school members carry out management arrangements.

The community service placed the actors within the empowerment so that the community service team was always active in carrying out group initiations. All of these activities were carried out simultaneously with data collection. Therefore, data collections relied more on field notes, participatory observations, training minutes, and was complemented by secondary data and focused on group discussions (FGD).

The qualitative descriptive analysis technique was used to explain the implementation process of the community service, which included the implementation of training, motivation sessions, and group consultations in the preparation of the organization and work programs.

**Table 1.** The framework of community service activities

No	Activities	Target	Time	Output
1	Education and Training and Forming the Sekolah Sungai Institution	The community: 50 College students: 20 Officers: 3 Assistant: 3	24-5-2017	Positive Mindset About the River LSS Organization Name of LSS
2	Knowledge transformation about the function of river and conservation	Communities Public Figures Village Apparatus	April-June	Capable of keeping and preserving the river
3	Determining the Work Program of maintenance and improvement of river function sustainably	The Management of Sekolah Sungai Institution	May	Document of LSS Work Program
4	Skill enhancement to change the behavior to be more positive in the river conservation	Members of Sekolah Sungai Institution	April-May	Behave positively towards the river
5	The implementation of sustainable program in keeping and preserving the river function	The management of Sekolah Sungai Institution and The Village Apparatus	June-Oct	Document of LSS Program Plan

### 3. RESULT AND DISCUSSION

The main goal of the community service as an implementation of the Environmental Sustainable Development (ESD) program was to facilitate a transformation of knowledge and skill mastery in river conservation. The attention and concern for rivers should be greater in the community. Especially with the population growth rate in Yogyakarta that reached 1.19% in the same year (BPS, 2017), the need for water should increase as a result. According to Setyono (2015), the relationship between humans and the environment is existential. Priyanto *et al.* (2013) state that the growth of the population reduces environmental quality such as river pollution.

An effort to encourage Tegaltirto community was to develop skills in river management. Due to the low understanding of the communities in the important aspects of the environment, it was expected that a substantive understanding of the function of the river would increase. As stated by Priyanto *et al.* (2013), eco-friendly environmental behavior can be shaped as expected. The step of carrying out Environmental Education is appropriate to provide an awareness process. The expected result according to Priambodo *et al.* (2006) is that community participation is required.

Learning starts from the process of recognizing values and clarifying concepts to develop the skills and attitudes needed to understand and appreciate the interrelationships among humans, culture, and their biological environment (Shaw *et al.*, 2009). To empower the community of Tegaltirto Village, a series of learning activities was formulated, which is presented in Table 1.

6	Pioneering process for exemplary behavior and capable of building the river.	Sekolah Sungai Institution	June-August	LSS Management can become the role model
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Source: Sulistiyani and Budi, 2017

The role of the local/indigenous community is the most important part (Axioma et al., 2005) in carrying out development. A series of plans for community service activities had been partially implemented. In particular, the implementation of education and training activities had been successfully implemented. Several indicators were used to measure the success that included the fulfillment of the target group quota from both community and students, the availability of training material for all participants, the ability of the speaker to deliver material, positive responses from and enthusiasm of the participants, the willingness of the participants to be directed, the formation of LSS, names assigned for LSS, and the formation of the LSS organizational structure.

The main characteristic of community service activities under the framework of ESD is the integration between the community and students as beneficiaries. Therefore, this activity was synchronized with the "Social Entrepreneurship" course, which is an elective course aimed at building academic and practical abilities. In terms of education and training participation, their number met the quota of 64 people. In detail, the training participants can be seen in Figure 3.

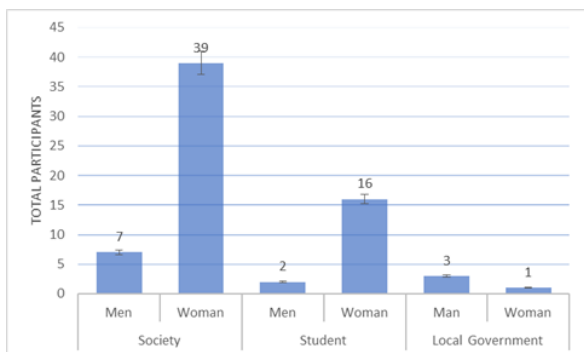


Figure 3. The Education and training were grouped based on the group and the gender, Source: Processed from primary data, Sleman, 2017

In terms of the attendance list, information about the number and distribution of disaggregated data for men and women was discovered. In general, the level of attendance was quite good, 46 people from the target community attended the training. Also, of the 20 students expected 18 students attended the training. Participants supported the establishment of the River School and were ready to actively participate in activities.

The apparatus provided good support; the district secretary and the head of the village opened the event with long and enthusiastic speeches. The secretary said,

"Sekolah Sungai is a new idea that needs to be welcomed to be realized". Sekolah Sungai is a community-based education institution that aims to transform knowledge, skills, abilities, and positive behavior about the river, so that it is maintained, secured, and sustainable in terms of water quantity and quality as well as its morphology (Sulistiyani, 2017). The sessions of the training can be seen in Figure 4.



Figure 4. The picture of institutional education and training of River Schools, Source: The Community Service Team's Documentation, 2017

The documentation informed that most of the training participants were predominantly female. Based on the data, the training participants were still not balanced between female participants, which was 72.16%, and male participants, which was only 17.94%. The interview with the head of government revealed that "coincidentally, many of the men were assigned to undertake other activities because the Regent of Sleman visited the district, but they were very excited to attend the training." Besides, based on the team's observations, the women of Tegaltirto Village were open-minded to the new information and willing to learn. However, in the long term, the unbalanced

participation needs to be addressed by intensive approaching youth to raise and increase their interest.

The training material distributions were managed by two speakers that presented the materials visually using situation map pictures and interesting technical drawings. The training and education increased public awareness of the importance of the Opak River in their life.

The two speakers had different styles in presenting the material, these made the participants interested and enthusiastic. Indeed, the participants gave positive responses and enthusiasm, so that the training went smoothly. The participants' responses to the training materials were very positive as they provided feedback in the form of sharing experiences and asking questions. The training was able to increase community knowledge of river maintenance. Figure 5 shows dialogical situations in the training.



**Figure 5.** Dialogical situations of education and training, Source: *The Community Services Team's Documentation, 2017*

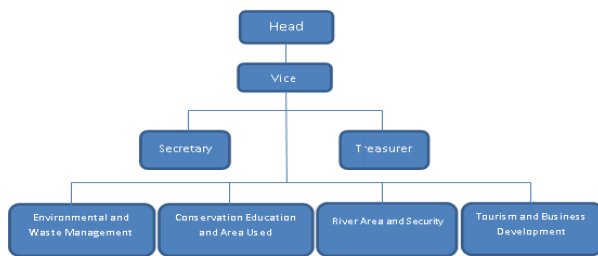
At the end of the training, the third session, the participants were facilitated to discuss forming an LSS. The LSS management was formed, consisting of the chairman, secretary, treasurer, environmental management section, waste management education section, environmental conservation education section, river recreation section, and culinary section. Institutionalizing river school organizations was the first step. Therefore, the discussion on May 13, 2017, resulted in the complete composition of the LSS management as seen in Table 2.

**Table 2.** The formation of LSS Tegaltirto Village

No	Position	Name	Address
1	Chairperson	Widiyanto	Sompilan
2	Vice Chairperson	Irianto	Blendangan
3	Secretary I	Fajar Hariyanto	Karangwetan
4	Secretary II	Martini, SE	Karangwetan
5	Treasurer I	Widaryati	Krikilan
6	Treasurer II	Tutik Haryati	Candirejo
7	Section of Environmental Management	Nanang Sunu Aji	Karangwetan
8	Section of Environmental Management	Rufianto	Krikilan
9	Section of Garbage Management Education	Jayariyah	Blendangan
10	Section of Garbage Management Education	Sunariyo	Berbah
11	Section of Environmental Conservation Education	Rinto Nugrah Setyawan	Krikilan
12	Section of Environmental Conservation Education	Sri Hijriyati	Tegalsari
13	Section of River Area Benefit	Hariyanto Kadarriniyati	Candirejo
14	Section of River Area Benefit	Hariyanto	Candirejo
15	Section of River Area Benefit	Kadarriniyati	Candirejo
16	Section of River Security	Yuli Muji Raharjo	Krikilan
17	Section of River Security	Sugito	Candirejo
18	Section of River Recreation	Tukiman	Kuncen
19	Section of River Recreation	Yunarsih	Kadisono
20	Section of Culinary Development	Iin Wibawati	Candirejo
21	Section of Culinary Development	Siti Fatimah	Candirejo

Source: Primary Data Processes, LSS, 2017

This complete management structure has a working area on the Opak River. The structural form of the mentoring is presented in Figure 6.



**Figure 6.** The organizational structure of Tirto Mulyo River School, Source: Processed from primary data, LSS, 2017

A small problem emerged when the community tried to determine the name of their LSS. Simultaneously, the participants said, "we have no idea about the LSS name". In response to this issue, the community service team proposed two possible names, which were LSS Tirto Mulyo and LSS Langgeng Tirto. The philosophical basis of proposing these names containing the word "tirto" had two orientations. Firstly, the existing location orientation and the existing connotation were taken from the name of the village (Tegaltirto). The second one was the cultural orientation of the Javanese language and literature. The word "tirto" was taken from the Javanese vocabulary, which means water. Meanwhile, the word "mulyo" has a meaning of forward-looking orientation, so that a river is a place full of kindness; the river school would teach and inherit noble behavior towards the environment. While the second name, "Langgeng" and "tirto", contains a forward orientation meaning, namely river preservation, and the word "tirto" has the same meaning. However, the decision on the LSS name was delayed for 19 days. After being motivated several times by the community service team, a new board meeting could be held on May 13, 2017, at the Tegaltirto Village office hall. The meeting succeeded in deciding the name of the LSS by agreeing to one of the names proposed by the community service team, which was "Tirto Mulyo".

The institutionalization of the river school had been transformed into an LSS. The integrated management support between the LSS and MSMEs were needed. From the Social Entrepreneur (the elective course) perspective, future insights need to promote river-based tourism. It is important to formulate a policy for the river school.

1. The development of the Opak River tourism included the development of MSMEs and Sekar Socan ginger and cashews.
2. The policy for structuring river tourism locations prioritizes the provision of public space and a local culinary center.

3. The innovation for strengthening "Kelompok Sadar Wisata" (*Pokdarwis*) is the local tourism awareness group that cares about tourism development. Pokdarwis was necessary to support Sekolah Sungai.
4. The network development strategy provided an overview of the importance of controlled management at the district level so that the management of the Opak River could become more integrated.

The benefits of the community empowerment carried out after LSS Tirto Mulyo was formed were outlined in several action plans on river preservation that can be coordinated properly. One of the suitable plans was to strengthen or reinforce the river cliffs using bamboo, and it was following ideas as stated in Poliel (2014). Widodo (2010) states that watershed conservation includes both the banks and the water environment. Some of the trees which are planted are bamboo, tanjung, gayam, kari, banyan, and kemuning. Integrated development plans relating to the environment and utilization of river tourism attractions can be compiled in an integrated manner. The new ideas come up as material for advocacy and building program schemes and action plans for integration with the village planning.

To develop the LSS, the information dissemination should be extended to youth organizations to get more support. Equal distribution of LSS institutional roles and functions to the wider community is needed. It is important to monitor the activities of the LSS in general and its sections in particular to run sustainable LSS programs.

#### 4. CONCLUSION

The strength of the output of these community service activities is the establishment of the community-based institution. LSS is an organization supported by community components, which is mostly concerned about the environment and village capacity building. The weakness of the output relates to the sustainable requirement on the educational efforts to achieve LSS empowerment independently.

Some of the community service activities were not successfully implemented, which were the preparation of an action plan, skills development, and sustainable program implementation. This situation was understandable given the implementation of the community service with a duration of 7 months, and at this time it had only completed one month at the beginning of the activity. The real results achieved were the fulfillment of river school institutional training, the establishment of the LSS named Tirto Mulyo along with its complete management with the organizational

structure. This LSS has provided a forum for community empowerment in river management.

Motivation and counseling methods, community training, education, consultation, and mentoring that were used in an integrated manner were the methods that were applied simultaneously. These methods were very suitable for the problems faced in the development of the LSS. These activities could facilitate the adaptation process in determining follow-up steps that are appropriate to the field conditions.

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