

River management: The importance of the roles of the public sector and community in river preservation in Banjarmasin (A case study of the Kuin River, Banjarmasin, South Kalimantan-Indonesia)

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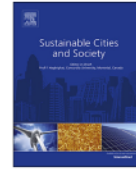
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River management: The importance of the roles of the public sector and community in river preservation in Banjarmasin (A case study of the Kuin River, Banjarmasin, South Kalimantan – Indonesia)

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ABSTRACT

River management has a role for all parties concerned. The high population pressure on the environment of the Kuin River, Banjarmasin, South Kalimantan, Indonesia has resulted in serious degradation. These conditions call for an effort of improvement. The objectives of this study were to investigate the interaction between people and the river environment, identify the programmes of the local government to improve the river, and explore the roles and obstacles faced by stakeholders in river management. The data were based on semi-structured interviews, surveys and documentation. The results showed that the river community utilized the river for their transportation, trading, and daily activities. Various efforts from the stakeholders, especially local government and community organizations, have been made for improving the condition of the Kuin River, but obstacles still remain. Such constraints come from the community's lack of awareness of environmental preservation and the government's lack of synergy with those involved in river management, including the obscurity on who is authorized to manage the river area. Therefore, coordination, cooperation and consultation among the stakeholders for every policy related to the river is necessary. The involvement of the local community also becomes essential for the integrated and sustainable river management.

1. Introduction

A river is defined as a natural water container or catchment that flow from upstream areas to an estuary (Wetzel, 2001). Due to its versatile functions, rivers attract people to make settlements around it (van der Velde, Leuven, Ragas, & Smits, 2006). Based on the River Catalogue data in 2015 from the Department of Water Resources and Drainage of Banjarmasin, there are 102 rivers flowing in Banjarmasin, which consist of 3 large rivers (width of river > 50 m), namely, the Barito, Martapura and Alalak Rivers; 45 rivers of medium size (width of river between 15–50 m), including the Kuin, Duyung, Andai, and Awang Rivers; and 54 small rivers (width of river < 15 m), among others the Guring, Tatas, Keramat, and Kuripan Rivers. For this city, rivers provide a drainage system and give distinctive characteristics for the life of the people, especially those that live on the river banks. The rivers function as transportation infrastructure, a support for economic activities, and a socialization locus. In addition, the river also functions

for daily activities (bathing, washing, and toilet), and in some places, especially on the river side, it is used for the location of sawmill and sand-mining (Angriani, Sumarmi, Ruja, & Bachri, 2016) (Fig. 1).

However, in addition to these functions, there is a negative impact of human activities on the river. Pollution from household waste, commercial and industrial activities, garbage, chemicals, etc., can affect the water quality. This will especially affect the use of the river as a drinking water source or as habitat for freshwater ecosystems. Due to these conditions, an effort to maintain and manage the river is needed. In Indonesia, maintenance and management of large rivers are usually carried out by the government, both central and local governments (Fulazzaky, 2014; Raharja, 2009; Subijanto, Harianto, & Hidayat, 2013; Vollmer, Prescott, Padawangi, Girot, & Grêt-Regamey, 2015), such as the Barito River and the Martapura River in Banjarmasin. Management becomes the authority of the provincial government (Geenen, Mieghem, & Dens, 2015; Widodo, Damayanti, & Hadi, 2012). However, the use and maintenance of medium and small rivers is commonly

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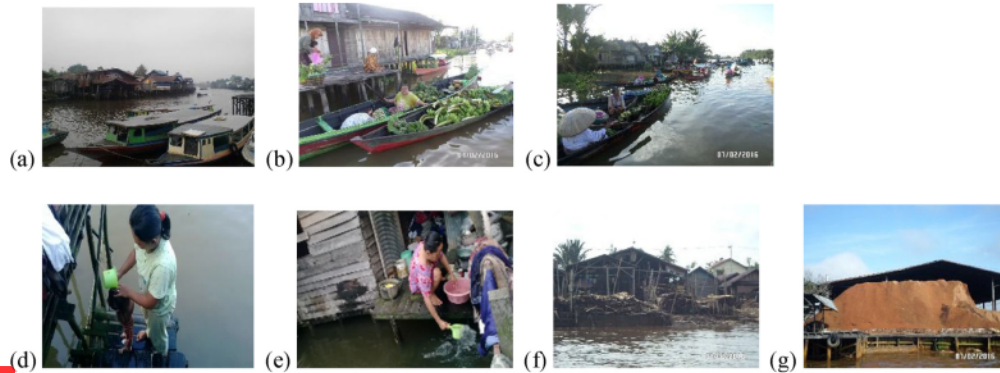


Fig. 1. The function of the river for the people in Banjarmasin; (a) klotok taxi, (b) and (c) trade activity in a floating market, (d) and (e) daily activities, (f) sawmill, (g) sand-mining (photos by Angriani, 2016).

carried out by the local community in their daily practices (Darmanto & Sudarmadji, 2013; Widodo, Lupiyanto, & Wijaya, 2010).

In addition to the Barito and Martapura Rivers, one of the rivers in Banjarmasin, South Kalimantan, Indonesia, which needs an improvement in river management is the Kuin River, because of its location in an urban area. The river flows through three villages, including Kuin Utara Village in the Sub-District of North Banjarmasin, Kuin Cerucuk Village and Kuin Selatan Village in the Sub-District of West Banjarmasin (Fig. 2). Along the river is a village known as Kampong Kuin. Kampong Kuin is considered a traditional village of Banjar. Kampong Kuin is named after the name of the river that flows in the village, the Kuin River.

During its development, residential areas near the Kuin River have

become quite dense, with many buildings constructed on the left and right sides of the river banks. The increasing economic activities, land-use change and growing population have resulted in high pressure on the river environment. The problems are becoming increasingly complex, starting from river water pollution, river constriction, and erosion to sedimentation. If this condition continues, it will negatively affect the site management of the river area and cause more social, economic and health problems.

The Kuin River has a strategic location; it is in a connected region between the Barito and Martapura Rivers. This river has also an exotic culture, such as the traditional floating markets that have potential for tourism. The existence of indigenous communities that formed the Banjar traditional village is another potential this region has. These

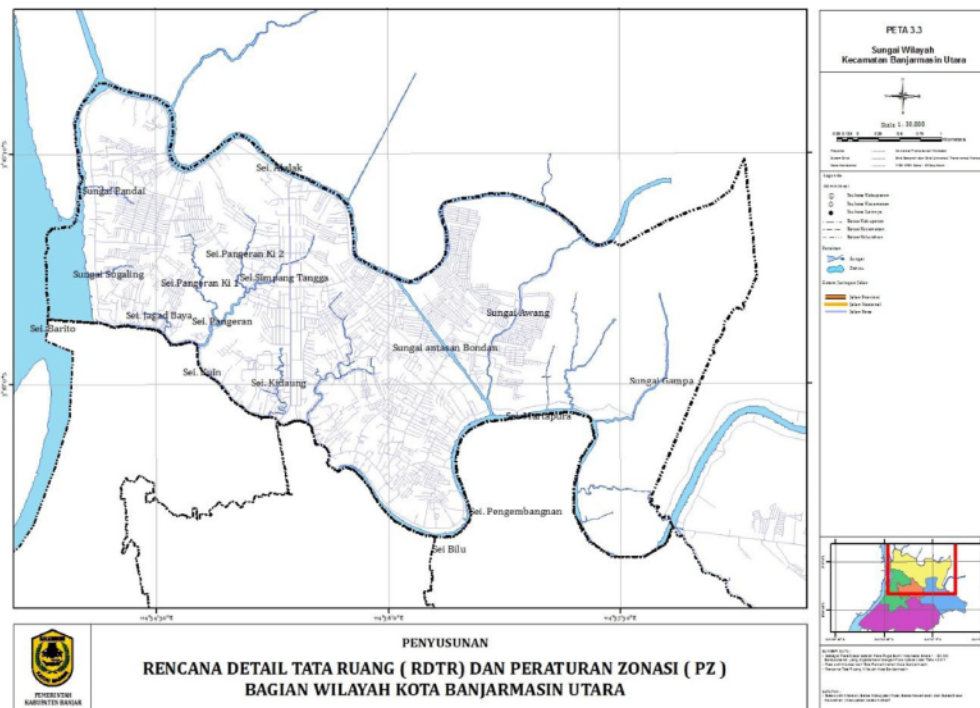


Fig. 2. Map of the Kuin River in North Banjarmasin Sub-District. Source: The Regional Development Planning Agency, 2015.

potentials have been the concern of many parties, and many programmes have been conducted in this river. However, those parties have not coordinated an integrated system to utilize and manage this area.

The Kuin River also needs the same attention as the management of the Barito River and Martapura River. In addition to the high population pressure in the area, resulting in the declining condition of the river, the lack of coordination and cooperation between stakeholders around the management of the Kuin River has not been done well. In this paper, we investigate the question of how the community and government can cooperate in managing the river. According to the research question, the purpose of this study was to investigate the relationship between the people who live along the Kuin River and their surroundings, identify the programmes of the local government to improve the river, and explore the roles and obstacles faced by stakeholders in river management.

2. River management in Indonesia

In Indonesia, the implementation of integrated water resource management was initially very challenging. In the 1970s, water resource management focused only on the technical, economic, and agricultural aspects (Sutrisno & Heryani, 2013). This is because water resource management was not a national priority or a major sector in national and regional development (Asian Development Bank, 2016). However, in the later development, the management of the water sector was reformed during the years 1998–2005, marked by the establishment of new laws and regulations that enabled the implementation of Integrated Water Resource Management (IWRM). In 1990, watershed management units were established with boundaries defined in a hydrological way (the river basin units). The master plan of the river basin units has shown a shift in the development approach to be more comprehensive and sustainable. To strengthen this policy, it is further regulated in water resources legislation, which explains that water resources must be managed in a comprehensive, integrated and environmentally friendly way.¹

Integrated water resource management (IWRM) principles are adopted in the law. First, there are three substantive components: (i) conservation, (ii) usage, and (iii) water security; and two supporting components: (iv) data management and (v) public participation. Second, there should be coordination to protect the interests of various sectors and stakeholders through the Water Resource Board both at the national as well as provincial levels and the Basin Council. Third, Indonesia's territory has been divided into River Basin Territories (RBT). An RBT is an area with hydrological boundaries, consisting of one or more watersheds.² Fourth, the legal basis related to public participation in river basin planning is listed in a strategic plan framework (Pattern) and a detailed master plan (Plan). However, these programmes were not fully covered in the national policy. Therefore, several policies have been designed to support the implementation of IWRM.³

22

¹ Law of the Republic of Indonesia on Water Resources, Number 7, Year 2004, article 3 mention that water resources are to be managed in comprehensive, integrated and environmentally sustainable way.

² Based on the Decision of President of Republic of Indonesia, Number 12, Year 2012 on River Basin Determination, 131 River Basin Territories have been determined, but in the Regulation of Minister of Public Works and Housing of the Republic of Indonesia No.04/PRT/M/2015 on Criteria and Determination of River Basins, there has been a change in the number to 128 River Basin Territories. This changed because River Basin Territories merged in Sumatra Island, namely Karimun Islands, Lingga Islands, Batam Island and Natuna Island River Basin Territories becomes the Riau Islands River Basin Territories.

³ Government Regulation of the Republic of Indonesia Number 42, Year 2008 regarding Management of Water Resources; Regulation of the President of the Republic of Indonesia Number 33, Year 2011 on National Policy on Water

Through the National Water Council, Indonesian government promotes a water management programme called Water Security or *Ketahanan Air*. This programme has become a national development policy that invited support from all sectors for the success of IWRM. The incorporation of a water management plan into local (provincial) development plans is needed to support the programme. With this approach, integrated water resource management can materialize (Asian Development Bank, 2016).

The current challenge that is a classic problem for the rivers in Indonesia, especially in Banjarmasin, is the problem of 3T, namely, Too much (flood), Too little (drought), and Too dirty (polluted). The emergence of such problems indicates that environmental systems that support the sustainability of water resources have been damaged (Kodoatie & Sjarief, 2008). This challenge becomes difficult, because in some places, the water supply increases (flooded), while elsewhere, the supply decreases (drought). This phenomenon can lead the conflicts between regions, sectors, user groups and individual users. Therefore, integrated and multi-stakeholder water resource management is the main issue for addressing water management issues in Indonesia.

3. Material and methods

18

This study uses a qualitative case-study approach. The data in this study consist of the results of the field survey conducted in February–May 2016. The data are gathered from existing statistical data, observations, semi-structured interviews, and documentation. The triangulation technique is used in order to maintain the validity of the findings. In this study, observation and interview are two main data collection techniques. In order to enhance the validity and reliability of the results, the data from both observation and interviews are elaborated. The data are also compared with existing documents, hence the data become valid.

2

3.1. Existing statistical data of the research area

Various datasets were compiled to analyse the environmental conditions and the surrounding community profile. The data on the management and use of the river were obtained from the local government of Banjarmasin, which included the Regional Development Planning Agency (BAPPEDA), Department of Water Resources and Drainage (DSDAD), Department of Environment and Department of City Planning Sub-Division of Slum Environmental Region, while the data of the geography and demographics of the study area were obtained from the Central Bureau of Statistic (BPS) of Banjarmasin.

2

3.2. Semi-structured interviews with key informants

During February–May 2016, field data collection (observation and documentation) and semi-structured interviews were conducted in the local community and with government officials. The interviews were conducted in three places, namely, the Kuin Utara Village, Kuin Cerucuk Village, and Kuin Selatan Village. There were a total of eleven informants, including 12 locals and three government officials of Banjarmasin from the Department of Water Resources and Drainage, the Department of Environment, and the Department of City Planning Sub Division of Slum Environmental Region (Table 1). In qualitative research, however, the sample is not intended to be representative since the “emphasis is usually upon an analysis of meanings in specific

(footnote continued)

Resources Management; Government Regulation of the Republic of Indonesia Number 38, Year 2011 concerning Rivers; Government Regulation of the Republic of Indonesia Number 37, Year 2012 on Watershed Management; Government Regulation of the Republic of Indonesia Number 12, Year 2015 concerning Water Resources Management.

Table 1
Survey Method in the Villages around Kuin River.

Village	Kuin Utara	Kuin Cerucuk	Kuin Selatan
Justification of surveyed village	- Related agencies - Residents who live along the banks of the Kuin River		
Technical survey approach	Secondary data collection, semi-structured interview		
Date of survey (month/year)	February – May 2016		
Interviewed people and their function ^a	- Bapak Saiful (head of hamlets) - Bapak Ahmad (food seller) - Ibu Masnah (house wife)	- Bapak Asnawi (vendor) - Bapak Udin (klotok driver) - Ibu Bainah (house wife)	- Ibu Laila (house wife) - Ibu Norjennah (house wife)
Average time to interviews	- 1 - 2 hours for every residents - 1 hour for government officials		

^a The names of informants are changed to protect their identity.

contexts” (Robinson, 1998). Semi-structured interviews were conducted in order to obtain information about the roles of the Kuin River in the local community, societal adaptation patterns, people's expectations, the efforts made to maintain the environment of the river and the obstacles encountered (Table 2). The interviews used open-ended questions that allowed the informants to answer the questions freely, so that the interviewer was able to obtain more information about the informants' experiences related to the river environment and their management strategy. The interviews were conducted in Bahasa Indonesia and the Banjar language, the local language. The interviews were recorded with a tape recorder. The interview recordings were transcribed in order to facilitate the data analysis. The data from the interviews were analysed to seek meaning, which is by constructing the themes, relations between variables and patterns in the data based on the content. Analysis of the content of the interview transcripts required

Table 2
Questions Asked during Semi-Structured Interviews.

Question	Rationale
The questions are about personal details (name, age, education background, gender, religion, members of family)	Socio-demographic
How long have you been living in Kuin Village?	Local environmental knowledge
Could you tell me about this river and the surrounding area?	Life value
What is the meaning of the Kuin River in your life?	
Why did you decide to live on the riverbanks?	Rational choice
What activities do you do related to the river function?	Habits community
Do you feel sympathy for the condition of the Kuin River?	Community care
If yes, what do you or the communities do to preserve the Kuin River?	
As far as you are concerned, is there any programme, either from government or the other stakeholders, regarding the maintenance of the condition of the Kuin River?	Community care
If yes, have you been invited to participate in the programme?	Public and government perception
What do the programmes involve?	
What are the problems faced in the ways to improve the condition of the Kuin River?	Public and government perception
What do you expect from the programme of the river and its surrounding improvement?	

to determinate of the underlying meaning of what was being said. The coding system used to sort and retrieve the data.

4. Findings and discussion

The findings begin with the description of the physical environmental conditions, socio-cultural activities, efforts made to improve the river environment, stakeholder's role and obstacles encountered in river management. Various interactions between the community and river are shown. Both physical and social aspects are considered.

4.1. Environmental physical condition

4.1.1. Kuin River characteristics

According to the data from Department of Water Resources and Drainage, the Kuin River is a medium-sized river. It is approximately 3909 m long and between 7 to 61 m wide. This river has a relatively small slope, with an average speed of approximately 0.74 to 1.45 m/s. A relatively small flow of water makes the river relatively quiet.

Physically, the Kuin River is a sub-division of the Barito River. Therefore, the tidal water flow depends on the water flow from the Barito River. The type of tide of the Kuin River is a diurnal type. In this type of tide, the water level goes up and down once every 24 h (Fadilah & Sasongko, 2014). The tide occurs for 5–6 h a day. The tidal flow in the Kuin River does not occur at the same time every day. Based on the interview with Bapak Saiful, the chief of North Kuin Village, the river tide is erratic. The water level sometimes rises in the morning and only subsides in the afternoon or vice versa, if the river rises in the afternoon, it will subside in the morning. He also said that the river tide does not cause floods on the mainland or matter for the houses built on the river bank because the houses in this area are “rumah panggung” or hovering houses, but the tides affect the river colour or turbidity. If the water subsides, the river water will look cloudy.

Along the Kuin River, the riverbank has nearly vanished from sight as it is covered with buildings. The houses that are built on the riverbank extend to the middle of the river. The average length of the building over the Kuin riverbank ranges from 9 to 10 m. It can be concluded that there are houses of the same length on the left and right sides of the river, which is 40 m wide. Thus, the remaining river area is approximately 20 m. This case proves that the riverbank along the Kuin River almost disappears, and the river has become increasingly narrow because of the buildings over the water body (Fig. 3).

Due to these circumstances, since 2012, the Banjarmasin



Fig. 3. House of residents or small shop built on the side of the Kuin River. (photos by Angriani, 2016).

Table 3

Average Measurement Results of Quality of River Water in Banjarmasin in April 2016.

Source: Department of Environment of Banjarmasin, 2016.

Measurement Type	Quality Standard ^a	Average Measurement Result
pH	6–9	6.4
COD	10 mg/l	39.82
DO	> 6 mg/l	2.99
BOD ₅	2–12 mg/l	6.44
Turbidity	5 NTU	21.21
Coliform	1.000 MPN/100 ml	87.948
<i>E. coli</i>	100 MPN/100 ml	54.507

^a Based on the Rule of the Ministry of Environment of Republic of Indonesia Number 5 of 2014 on the Quality Standard of Wastewater.

government has begun to implement a system of Certificate of Land Condition to reduce the rate of settlement growth over the river.⁴ Based on the interviews with Bapak Sumarsono, the Chairman of Sub-Division of Slum Environmental Region:

“... because of their Kampong Kuin title as the cultural heritage, the status quo is made to the residents whose houses are built right on the riverbank. They may still occupy the houses as long as there are no eviction plans by the government, but they should not extend the size of the houses and/or renovate the buildings...”

The policy that he describes is contained in the Banjarmasin Local Regulation, which regulates the river border and its utilization.⁵

4.1.2. Water quality of Banjarmasin River

The results of monitoring the quality of river water in Banjarmasin by the Department of Environment in 2016 showed the level of river water pollution is already at an alarming rate. Table 3 shows the results of river water quality measurement in Banjarmasin. The samples were taken at 10 point measurements.

According to information from Ibu Nina:

⁴ Local Regulation of Banjarmasin Number 15, Year 2012 on Building Permit.

⁵ Regional Regulation of Banjarmasin Number 31, Year 2012 on the Determination, Regulation of River and River Used Boundary Utilization, article 15 paragraph (1) mentioned that the river border land that has been used for municipal facilities, buildings, roads or other public facilities, land designation that already exist is designated as the status quo area, paragraph (2) border areas that are already owned by the community, the allocation must gradually returned as a river border, and paragraph (3) land ownership rights as referred to in paragraph (2) shall still be recognized, but landowners shall comply with the designation of land use as a river border and shall not be allowed to use it for other purposes; Regional Regulation of Banjarmasin Number 5, Year 2013 on Banjarmasin Spatial Plan of 2013-2032, Article 44, letter (b) mention that the settlements already established in the water catchment areas before being designated as protected areas are still allowed, but they are not allowed to add to the buildings.

“... the largest source of pollutants is from human waste (traditional waste water directly into the river) or traditional wooden septic tanks resulting in human waste flowing into the river. Increased pollution of *E. coli* bacteria in rivers also occurs because of the floating toilets used by communities along the river banks...”

Based on the interview and data in Table 3, the average *E. coli* bacteria was 54.507 MPN/100 ml, while the *E. coli* standard was only 100 MPN/100 ml. The *E. coli* content exceeding the limit of this quality standard indicates that water has been seriously polluted. People's habit of disposing trash into the river also contributes to the water pollution. When the tide occurs, plastic waste will be carried away by the water and when the water recedes, the garbage will be stuck under the houses and accumulate over time (Fig. 4). In addition to its effect on water quality, plastic waste will also cause more rapid silting of the river.

4.2. Effect of socio-cultural activities on the relationship to the Kuin River

Social life in Kampong Kuin cannot be separated from the river. The river is a form of natural capital for the tribe. In the 1900s, the river was a major transportation route prior to the road construction in Banjarmasin (Subiyakto & Suryo, 2001; Subiyakto, 2005). Boats or *jukung* were the only means of transportation to reach the surrounding areas. Houses were also originally built facing the river as the front yard. However, along with the development of the area, especially with road construction, river transportation has been replaced by land transportation. The majority of the houses, now facing the street, are built directly above the water. This building pattern will affect the behaviour of the inhabitants towards the river. Rivers eventually become a back yard that also function as landfills.

Regardless of the development of land transportation, people's lives in Kampong Kuin still depend on the river. One proof is the floating market in the Kuin River estuary (Fig. 5). This floating market has existed since Banjar Sultanate was established on the banks of the Kuin River (Norpikriadi, 2015). The *Muara Kuin* floating market is one form of trading interaction patterns of people who live on the river. The sellers and buyers conduct trading activities on traditional boats, such as *jukung* or *klotok*. Transactions can be carried out both by barter among fellow vendors and by using money in exchange for goods or services. Barter is done by exchanging goods such as fruits, vegetables, or fish for basic needs such as staple food items or agricultural products. This market opens after the dawn prayer and ends at approximately 09:00 am. When the market is closing, it will become gradually quiet as the trader boats are leaving and going along the Kuin River and the other smaller rivers to continue selling their goods to the other residents whose houses are on the riverbanks. The residents will wait for the sellers on their *batang*, a kind of bridge or platform at their house that is built on the river. This *batang* or bridge made from *ulin* wood (iron-wood) provides the connection for the houses along the river that the people use to reach other houses or to go to the river (Angriani et al., 2016).



Fig. 4. The physical condition of the Kuin River as garbage is stuck under the houses. (photos by Angriani, 2016).

4.3. River improvement programme in the Kuin River

In the Kuin River improvement programme, until now, various efforts have been made by the Banjarmasin Government to restore river functions properly, both ecological and cultural functions. Restoring the ecological function of the river is done by returning the riverbank area to open space. This has been done by the government since 2014–2015 in two places in the Kuin Utara village, namely, in front of the grave and mosque of Sultan Suriansyah. Whereas the other Kuin riverbanks, until now, are still in the effort of deliberation with the residents for the next relocation stage. Restoring river function in terms of culture is done by preserving the boating tradition, which optimizes the existence of the river as a water transport infrastructure and revives the existence of a floating market as the identity of the Kuin region.

Based on the interviews with Bapak Fauzi, the local government official:

“... the restoration of the Kuin River region has become part of the planned programme of the government of Banjarmasin City. The programmes that have been implemented since the previous year (2015) and still continue today are normalizing and dredging the Kuin River, conducted by the Department of Water Resources and Drainage. These activities aim to reduce sedimentation. A levee is made to reduce the erosion rate...”

According to him, the most important thing in this programme is the plan to restore the Kuin riverbank (Fig. 6). This is a challenging programme because it directly involves the people living along the riverbanks, and thus, this programme may create conflicts with them. The houses located along the riverbanks should be relocated, so the socialization of the management and regulation of the river by the government still continues to inform the people of the government programmes in managing and restructuring the river area and invites them to actively participate in the programme.

Additionally, the same thing was shared by Ibu Nina and Bapak Sumarsono. According to them, the improvement programme of the Kuin River needs to consider not only physical aspects, but also socio-cultural aspects of Kampong Kuin community, especially of those living

on the Kuin riverbank. Increasing their awareness of river environment is very important. Without any concern from the local community, the river improvement programme will not be easy to be realised, even if the maintenance efforts of the Kuin River continues to be done. Therefore, educating the communities living along the riverbanks to improve their understanding of the importance of changing their habits, which are not pro-environment, becomes essential (Laurens, 2012).

The willingness of the community to support these programme is very significant. To increase community participation in river improvement programmes, the government established river preservation programmes based on community. One of them is the *Maharagu Sungai* competition. *Maharagu Sungai* is a word in the Banjar language that means to preserve the river. The purpose of this programme is to raise awareness and increase community participation to maintain and preserve the river in their environment. In that activity, the community works together to clean the river and reforest the riverbanks by planting local plants of Kalimantan that can withstand river abrasion, such as *Rambai Padi* (*Sonneratia sp*), *Jingah* (*Gluta rengas*), and *Putat* (*Planchonia valida*).

In addition to community activities, community-based river management is also done in the form of empowerment of local communities, namely, through the formation of communities and groups of river management cooperation. To optimize the empowerment of this community, someone should be appointed who has a commitment and a high concern for the sustainability of the river. These people are referred to as *Pemangku Sungai*. *Pemangku Sungai* are chosen based on deliberation among the people in the neighbourhood. They play a role in stimulating the participation and guidance of surrounding communities to play a role in managing the river in their environment. Based on the data of the Department Environment of Banjarmasin, there are 52 *Pemangku Sungai* that has been confirmed by the Mayor of Banjarmasin in 2016.

In these river improvement programmes, the government also invites non-government organizations (NGO) that are concerned with the river issues in Banjarmasin. One of them is the *Melingai* community. The *Melingai* community is a group of various community organizations concerned with the preservation of the river, including *Masyarakat*



Fig. 5. (a) Activity of the floating market in the Kuin estuary, (b) and (c) a trader down the Kuin River after the floating market is closed, selling their goods to the other residents along the river. (photos by Angriani, 2016).

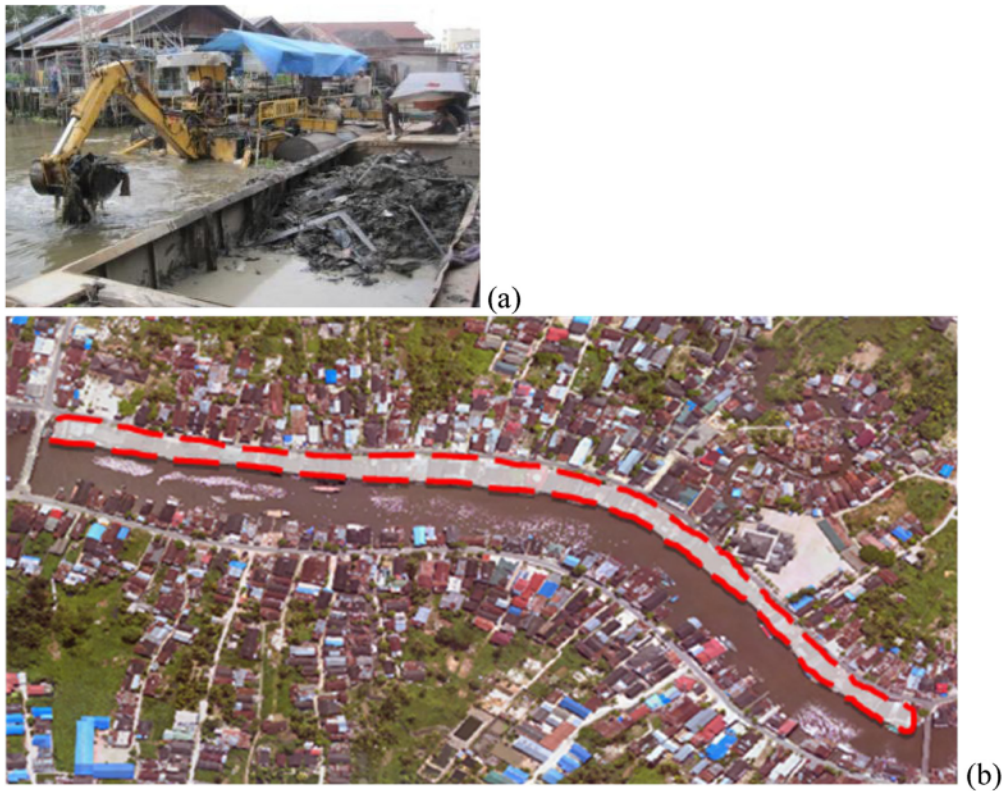


Fig. 6. The government programmes to improve the Kuin River: (a) dredging the river with a *Biyoko* boat, (b) restructuring plan of the Kuin riverbank (in front of Sultan Suriansyah Grave) Fiscal Year 2016.

Source: Department of Water Resources and Drainage, 2015.

Pecinta Pohon, Forum Komunitas Hijau, Pena Hijau, Sahabat Bekantan Indonesia, and others. *Melingai* is an abbreviation of *Masyarakat Peduli Sungai* (River Care Community). However, the literal meaning of *melingai* itself in the *Banjar* local language is cleaning. These organizations gain positive responses from society and many people sign up to be volunteers. An important duty of this community includes providing environmental education to the people by inviting them not to throw garbage into the river, planting trees on the riverbanks, cleaning up garbage in the river, breeding fish in their natural setting, educating people on reducing the use of river toilets, and campaigning against housing that threatens the existence of the river.

The other institutions that also participate in this programme are universities and research centres. The results of research related to the river, such as on river quality, river morphology, or river area arrangement, can be utilized as a reference by the government in making their policies on the management and regulation of the river area.

4.4. Obstacles and role of stakeholders in Kuin River management

4.4.1. Community awareness of the environment

There are still many obstacles faced in the conservation and management of rivers in Banjarmasin, especially in the area of the Kuin River. The first obstacle comes from the community, especially the people who live on the riverbanks. People still lack an awareness of environmental preservation of the river. The interviews with the local residents show that the people throw garbage into the river because of its practicality and the people's assumption that the garbage will eventually be swept away as the river flows. The lack of landfills and

cleaning workers are also the factors motivating people to dispose their garbage in the river. Here, are some results of an interview related to the waste problem:

.... *Bahanu amun handak lakas ada ai tabuang kasungai, nya kada papa jua larut haja jua. handak maantar kapambuangan sampah jauh....*

(Translation: if we want [to get it done] fast, we throw [the trash] into the river. It is not a problem because it will be swept away [anyway]. We want to dispose it at the landfill but it's far) (*Ibu Masnah*).

.... *Amun nang ganal-ganal atau palastik kami kumpulakan pang, tapi amun ratik daun atau bekas makanan kami buang kasungai'ai....*

(Translation: We collect big trash or plastics, but we throw the leaves or leftover food into the river) (*Ibu Norjenah*).

On the other hand, there are people who are willing to change the neighbourhood condition. For example, they want either the government or the society to provide cleaning workers to collect trash from houses. The people are willing to pay the cleaning fee. They also need the local government to provide temporary landfills near the housing. The following is an excerpt of the interview with one of the residents:

.... *Kadada pang, tapi jakanya ada nang hakun buhannya nang kada bagawi gasan memutiki sampah diadakan gerobak seikung sebuah gasan memutiki sampah-sampah warga supaya kada membuang kesungai, kasian sungainya. Digajih urangnya, biarha 5000 kah sabuah rumah....*

(Translation: there is no trash picker, but it will be better if there are, those who don't have jobs, to collect the trash so that it won't be thrown away into the river. The river is polluted already. We are

willing to pay the workers. Let's say 5000 rupiah per house monthly) (*Bapak Ahmad*).

Another obstacle is related to human waste management. Disposing of household waste directly into the river pollutes the river. In addition, although the local water supply utility to residents' homes is already available, the daily activity in the river, such as bathing, washing and toilet (33) still a habit of some residents. According to the interview, the use of the river as a public toilet is common. The interview result is as follows:

.... *Biasa'ai mandi disungai, apalagi pas banyu pasang, rami kakanakan bacaburan...*

(Translation: It has become a habit to bathe in the river, especially with the tide, many children jump into the river) (*Ibu Bainah*).

.... *Mandi disungai atau bahira dijamban kami biasa ja, sudah kabiasaan jadi kada papa'ai...*

(Translation: Bathing in the river or using the toilet on the river is a common activity among us. It is a habit so it's OK) (*Ibu Laila*).

.... *Bajambanai kami dirumah, tapi kadada kotaknya dibawa, jadi langsung, kamana lagi mambuung amun kada kabawah...*

(Translation: We have a latrine in our homes, but there is no septic tank so that the waste is thrown downward below the house [river]) (*Bapak Udin*).

.... *Rata-rata nang bagana di atas sungai tu baisianai jamban, tapi kebanyakan kada be-septik tank, langsung plung kabawah...*

(Translation: most of the people have a house on a riverbank and it is completed with latrine, but they do not make a septic tank, so the waste is thrown downward below the house (river) (*Bapak Asnawi*).

Based on the interviews with the residents, bathing or defecation in the river has become a habit, especially for residents who live on the riverbanks. Because the river water flows, they feel there is no problem with that waste. However, in fact, using the river as a public toilet will affect the quality of the river water. Therefore, there is a need for a sanitation system to filter the waste so that it will not pollute the river. One effective way is building a Waste Water Installation (IPAL) with a communal septic tank system. Communal septic tanks are reservoirs created to accommodate domestic waste from 5 to 10 houses or more with piping systems. This waste is accommodated into the waste tank, which is water resistant (*Indonesian Sanitation Development Team, 2010*).

Another obstacle that comes from the community and is most important, is raising awareness to not live on the riverbanks. Under government regulations, living along the riverbanks is illegal. However, land for housing is limited and expensive, so people choose to build houses on the riverbanks. Thus, the government and the people themselves should find a solution that fits everyone, especially related to the plan of relocating the riverbank residents.

Even if the houses along the riverbanks are protected because the Kuin area is a *Banjar* heritage area, the government should control the growth. The management can be done through a socio-cultural approach. Physically, the establishments are managed according to the culture that cherishes the river (river culture), so the buildings should be built facing the river. The houses should have two fronts (veranda), one facing the road and another one facing the river, and it is expected that the cleanliness and preservation of the river can always be maintained. The houses are built with the concept of stage houses with environmentally friendly material.

The role of the community is very important in protecting the environment; for example, every urban village could be provided a temporary garbage dump so that people no longer throw garbage into the river; citizens could sort and process their own waste, especially household waste; a Garbage Bank could be set up in every village so that people can keep their garbage and the garbage can be reprocessed and bring benefits, such as recycled products; self-help made human waste shelters could be made so that the waste is not directly

discharged into the river (environmentally friendly sanitation).

4.4.2. Government and its authorities

River management involves many agencies from different levels of government. Coordination, cooperation, and consultation among government agencies, either vertically or horizontally, need to be developed to avoid conflicts of interest among related institutions. However, in fact, the lack of synergy between the related agencies in river management is the main obstacle faced by the government.

According to *Bapak Sumarsono*, a service officer from the city government, this is due to each department having its own authority and programmes with regard to river management, whereas successful river management will be largely determined by all institutions involved, such as the Department of Housing and Regional Infrastructure, the Public Works Department – Sub-Department of Water Resources and Drainage, the National Land Agency, the Regional Development Planning Board, other institutions, relevant stakeholders (from the top to the grassroots level, private or public), and the management infrastructure (regulations, Spatial Planning, etc.).

To prevent conflicts of interests among these agencies, coordination, cooperation, and consultation in policymaking are important. This coordination is also an attempt to harmonize particular policies and strategic interests to achieve general objectives of good river management. In addition, there should be clear and strict rules regarding the riverbank and its utilization. The rules are supported by all agencies, in order to regulate the relevant interests and to be used as a legal reference by all related sectors.

Another challenge is found at the level of the sub-district government, because it is not certain as to who is authorized to manage the river and its surrounding areas. The sub-district government plays a less active role or does not have a clear understanding of river management despite its important role as the government coordinator of the region.

The unclear coordination among the district governments leads (sub-district government) to different views of the riverbank region between one village government and the others. The government of a city/district, province, and irrigation agencies have many activities/programmes related to the river, especially for the purposes of building a river border (physically). However, they do not empower or educate society about the management of rivers and river basins, which includes community involvement in the planning, implementation, and maintenance programmes. This is due to the lack of local government regulations for the basic legal and technical guidance in engaging society in the conservation and utilization (management) of the river.

Obviously, community involvement through empowerment in river management is another problem that needs attention. Until now, people have only been considered objects, while they are the people who directly interact with the actual conditions (*Padawangi et al., 2016; Prescott & Ninsalam, 2016*). These people also have good intentions regarding the river environment improvement programme. Involving the community, especially the local communities, by empowering them is an active action. This case makes people care about the environment and participate in the planning, implementation, and evaluation programmes related to river preservation.

In the case of the *Kuin River*, the community is aware of government programmes related to river improvement through government socialization (Fig. 7), but in practice, the community has not been fully involved. Based on information from *Bapak Saiful*, residents are actually willing to engage in government programmes, but they want transparency for these activities, especially related to budgetary funding and the sustainability of assistance after the evaluation of activities.

Based on the conditions in the field, river problems do not only require technical solutions, but a comprehensive solutions that answer related social, cultural, economic, and institutional problems. This programme needs an environmental management system that can unite all actors, resources and actions. Coordination, cooperation and consultation among stakeholders have become keywords in integrated and



Fig. 7. Socialization of the Department of Water Resources and Drainage of Banjarmasin with society about the management of river and drainage in 2016. Source: Document of the Department of Water Resources and Drainage of Banjarmasin, 2016.

sustainable river management (Ait-Kadi, 2016; Campbell, 2016; Chan, 2005; Hermans, Erickson, Noordewier, Sheldon, & Kline, 2007; Maryono, 2014; Mitchell, 2005; Rahaman & Varis, 2005).

5. Conclusion

Some conclusions obtained in this study are as follows. First, the Kuin River still has a very important role in the community of Kampong Kuin, which can be seen from the dependence of this community on its environment. For example, among other things, the community still utilized the river for their transportation, such as by *klotok* and *jukung* or by footbridges made from *ulin* wood that provide connection between houses along the river that the people use to reach the other houses or to go to the river; for trading activity on the river through the existence of a traditional floating market in the Kuin River estuary; and for daily activities, especially for bathing, washing, and toilet, although there are clean water connections from the local water supply utility.

Second, the Kuin River improvement programme is one of the efforts carried out by the local government of Banjarmasin in order to restore river function. The activities include normalizing and dredging the Kuin River to reduce sedimentation, construction of a levee to reduce the erosion rate, and the most important thing in this programme is the plan to restore the banks of the Kuin River. The interaction between the government and community can be shown in many programmes, such as the socialization programme. The socialization of the management and regulation of the river by the government still continues to inform the people about the government programmes in managing and restructuring the river area and invites them to actively participate in the programme. The community welcomes the Kuin River improvement programme by the government. However, they want full involvement in the programme, including in the planning, implementation, and evaluation of the programme. In Indonesian context, the involvement of community in river preservation needs to be done from the beginning. Such participation indicates that the community acts not only as the object, but also as the subject taking part in preserving the river environment. It is expected that the community can participate continuously. To build cooperation with local communities, the local government of Banjarmasin inaugurates a person who has concern for the sustainability of the river, referred to as *Pemangku Sungai*. *Pemangku Sungai* and community organizations concerned with the river environment are a bridge between the community and the government in terms of river management.

Third, in the effort to conserve and manage the Kuin River, many obstacles have been faced, among others, from its own community, especially the people on the river banks. Their awareness of the maintenance of the river environment is lacking. Therefore, in the river improvement programme, changes in community behaviour are needed, while from the government side, obstacles can be seen from the lack of synergy between related agencies in terms of river management,

which can lead to conflicts of authority between government agencies. Therefore, coordination, cooperation and consultation among the stakeholders in every policy related to the river is necessary. The involvement of the community with river programmes also becomes essential for the integrated and sustainable management of the Kuin River.

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