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Japanese's River Culture as an Alternative Flood Prevention Remedy in DKI Jakarta during Rainy Season

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ABSTRACT

As many other cities in the world, DKI Jakarta faces serious problems in the flood. In rainy season, common flooding is caused by several factors as follows: lowland areas in the northern part of Jakarta below sea level, urbanization rate, irregular population density, slum neighborhood where scattered rubbish where quickly provoke the flood to stagnate and increase rather than receding. This flood is mainly caused by not only above factors but also land subsidence an average of 5-10 cm every year. This paper reviews the Jakarta government's plan for flood prevention. Positively, Jakarta government has done some good policies such as the development of flood retaining spaces, dredging activities for shallow water rivers, water pumps development and management team. On the contrary, the government has made evictions to the communities located around the river, causing humanitarian and political issues. In order to overcome above issues, the paper proposed possibility application of Japanese's river culture in DKI Jakarta as remedy for prevent flood during rainy season.

KEY WORDS: *Japanese's River Culture; Flood; Jakarta.*

NOMENCLATURE

WFC	West Flood Canal
EFC	East Flood Canal
DKI	Daerah Khusus Ibukota
BMKG	Badan- Meteorologi-Klimatologi-Geofisika
JABODETABEK	Jakarta-Bogor-Depok-Tangerang-Bekasi
BPBD	Badan Penanggulangan Bencana Daerah

1.0 INTRODUCTION

The high rate of urbanization in DKI (Special Capital Region) Jakarta has caused many problems such as unemployment, crime, economic equality, housing, floods, traffic congestion, poverty, slums, clean water and urban planning. Other than that, DKI Jakarta also faces some unique water infrastructure challenges, caused by 13 rivers such as Ciliwung, Kalibaru, Pesanggrahan, and other rivers. The topography of Jakarta is problem that the large expanse of the city sits below sea level, with some sinks 25 cm per year with an average of 5-10 cm as shown in Figure.1.1.

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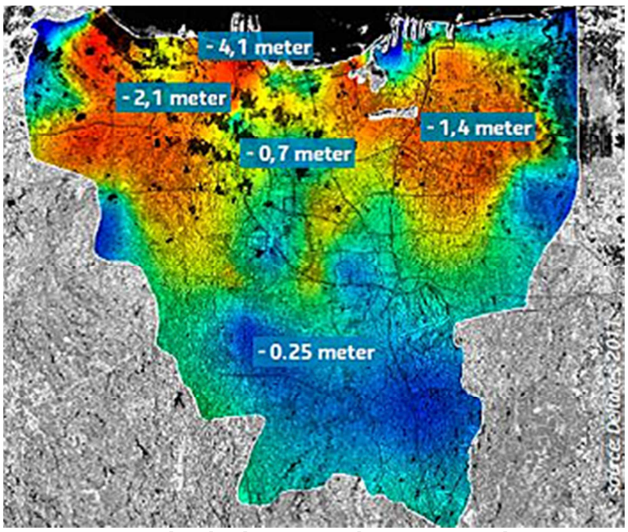

Figure.1.1: Land subsidence in Jakarta in period 1974-2010 [Indonesian & Dutch].

Flooding is a perennial problem that happens every year in rainy season. Common flooding is caused by several factors as follows: lowland areas in the northern part of Jakarta below sea level, urbanization rate, irregular population density, slum neighborhood where scattered rubbish where quickly provoke the flood to stagnate and increase rather than receding. Flooding occurs on the northwest coast of Java, at the mouth of the Ciliwung River on Jakarta Bay. The floods have happened recently in 1996, 2002, 2007 and 2013, 2014, 2017. When rainy season, floods occur in Jakarta for various reasons and overlap, such as: rivers filled with garbage, clogged waterways, high river sedimentation, and overflowing seawater. Flood water mixing with garbage piles in the cramped residential areas can spur disease, including skin infections and diarrhea, especially in children under the age of 5.

2.0 CLIMATE CHANGE IN INDONESIA

Indonesia is the fourth most populous nation and a significant emitter of greenhouse gases due to deforestation and land-use change. Indonesia consists of nearly two million square km of land, most of which is covered by forests. However, deforestation and land-use change is estimated at 2 million hectares (ha) per year and accounts for 85% of the Indonesia's annual greenhouse gas emissions. The combination of high population density and high levels of biodiversity together with a staggering 80,000 km of coastline and 17,508 islands, makes Indonesia one of the most vulnerable countries to the impacts of climate change. The overall observed surface air temperature in Indonesia has increased by approximately 1-3°C over the last century [Michael Case, et.al].

Indonesia's economy is heavily dependent on these natural ecosystems and their resources but there are threats to their sustainability. Current threats include Indonesia's increasing population and rapid industrialization, such as large-scale deforestation and wildfires, land conversion and habitat destruction, overexploitation of marine resources, and a multitude of environmental problems associated with rapid urbanization and economic development and now climate change. Climate change threatens not only to exacerbate the aforementioned issues, but also create new ones, some of which are already taking place.

Indonesia has a tropical climate, with two distinct seasons; monsoon wet and dry. The rainy season is usually from November to April, with some regional variations. Jakarta as capital city of Indonesia has the heaviest rainfall from January to February. Average annual rainfall varies greatly with the lowlands receiving about 1.7 to 3.1 cm and the mountainous regions getting up to 6.1 cm. Average annual temperature is less variable and ranges from 23-32 °C.

3.0 DKI JAKARTA

3.1 History of Jakarta

Jakarta is the capital city of Indonesia as well as the largest city which is located on an estuary of the Ciliwung River. Short story, Jakarta was called Sunda Kelapa in the Kingdom of Sunda period then it was changed to be Jayakarta in 22 June 1527 during period of the Sultan Banten. In 4 March 1621 during Dutch colonial period (1619–1949), it was called as Batavia as shown in Figure.1.1, and then it was changed to be Jakarta Tokubetsu Shi in 8 August 1942 during the Japanese occupation. As Japan's defeat in World War II, Indonesian declared its independence on August 17, 1945 at Jalan Pegangsaan Timur No. 56 (Jalan Proklamasi), Jakarta Pusat and the position was immediately changed to the National Government of Jakarta or Provincial Government of DKI Jakarta.

Figure.1.2: Batavia under the Dutch colonial period, 1780 [Wikipedia].

3.2 Geography of Jakarta

Jakarta lies in a low and flat alluvial plain, ranging from -2 to 50 metres with an average elevation of 8 metres above sea level with historically extensive swampy areas. 40% of Jakarta is below sea level particularly the northern areas, while the southern parts are comparatively hilly.

There is thirteen rivers flow through Jakarta. Firstly, river of Ciliwung divides the city into the western and eastern districts. The river of Ciliwung is across the city northwards towards the Java Sea which flows from the Puncak highlands to the south of the city. Other rivers include as follows: Kalibaru, Pesanggrahan, Cipinang, Angke River, Maja, Mookervart, Krukut, Buaran, West Tarum, Cakung, Petukangan, Sunter River and Grogol River. These rivers flow from the Puncak highlands to the south of the

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city, then across the city northwards towards the Jakarta Bay as shown in Figure.1.3

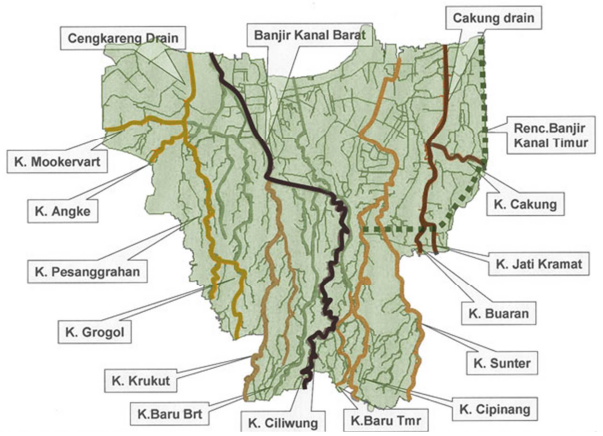

Figure.1.3: List of rivers in Jakarta [Pemprov DKI].

3.3 Population of Jakarta

Since 1950, Jakarta has attracted the attention of many people from all over Indonesia. The large number of migrants came to Jakarta for economic reasons and job vacancies. Based on the 1961 census shows only 51% of the city's population is born in Jakarta. Megacity Jakarta increased from 11.91 million people in 1980, 17.14 million in 1990, and 20.63 million in 2000 to 28.01 million in 2010. In 2010, broader Jakarta accounted for 11.79 percent of the total population of Indonesia, but with this population is below 0.3 percent of the total area of the country. Jakarta has an estimated population of over 10 million people in 2016 as shown in Figure.1.4.

DKI Jakarta covers an area of 662.3 km2 of land area and 6,977 km2 of sea area. The Greater Jakarta metropolitan area has an area of 6,392 km2 as shown in Table.1.1. DKI Jakarta consists of five Administrative Cities as follows: Jakarta Pusat, Jakarta Barat, Jakarta Selatan, Jakarta Timur, Jakarta Utara as shown in Figure.1.5 and an Administrative Regency: Kepulauan Seribu.

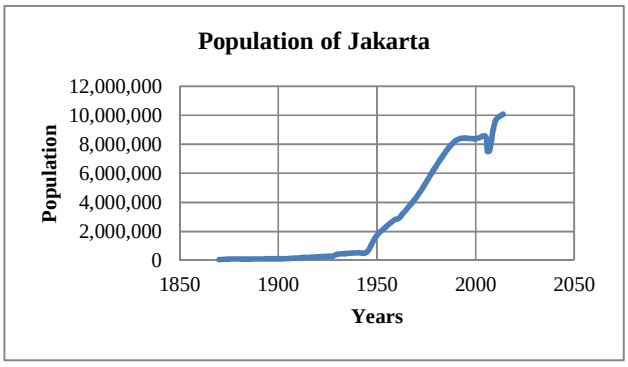

Figure.1.4: Statistic population of Jakarta in 1860 – 2014.

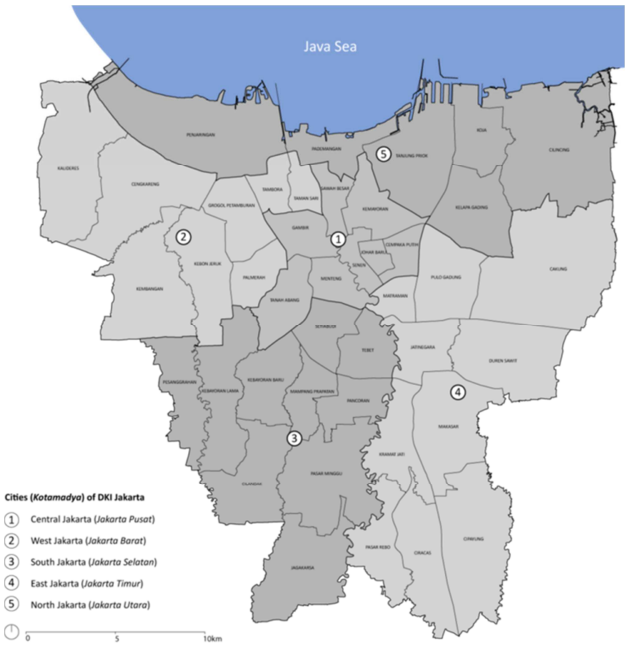

Figure.1.5: Map of the municipalities in Jakarta [DKI Jakarta].

3.4 Rivers Pollution

Since ancient times until now, the river has become an important part in human life. Around the world, rivers are used in addition to transportation, many people use the river for various purposes such as washing, bathing, sanitation, even cooking. There are also a variety of fish in the river that can be caught and consumed to meet the nutrients that humans need. It can happen if the river is clean and free of pollutants.

Table.1.1: Jakarta's Municipalities

City/Regency	Area (km2)	Total population (2014)	Population Density (per km2)	HDI 2014 Estimated	HDI level

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			in 2014		
Jakarta Barat	129.54	2,430,410	18,762	0.797	High
Jakarta Selatan	141.27	2,164,070	15,319	0.833	Very High
Jakarta Utara	146.66	1,729,444	11,792	0.796	High
Jakarta Timur	188.03	2,817,994	14,987	0.807	Very High
Jakarta Pusat	48.13	910,381	18,915	0.796	High
Kepulauan Seribu	8.7	23,011	2,645	0.688	Medium

Note: Human Development Index (HDI)

DKI Jakarta with all its prowess and beauty is very interesting to attract people to come. It has become the most popular urbanization destination. The city is crowded with too many people. This caused many residents to have difficulty in the settlement. Those who do not get home end up making semi-permanent homes in various places, one of which is the riverside land. The land along the river in Jakarta has turned into a slum. People inhabiting slum dwellings usually have a bad habit of throwing anything useless into a river. Because their house is right on the banks of the river so that any waste they produce will soon be thrown into the river.

Moreover, many other people also just pass the garbage carelessly. They do not realize that the waste will flow into the river. In turn, the river becomes filled with garbage and then undergoes siltation. The shallowness of the river causes not able to accommodate the flow of water. When the rainy season arrives, the polluted shallow river will cause flooding. River water floods carry harmful bacteria that eventually cause many other diseases.

Among the rivers in Jakarta, the most contaminated is the Ciliwung River. The river is accused of being responsible for annual flooding in several places in Jakarta. The quality of Ciliwung river water is highly polluted in all segments, from upstream (Puncak, Bogor) to downstream (DKI Jakarta). Fluctuations in river water discharges between dry and rainy seasons are high enough to cause regular flooding in Jakarta.

In May 2011, the Jakarta Environmental Management Board categorized all rivers in Jakarta as polluted; 71% were heavily polluted, 20% partially polluted and 9% tainted lightly.

Responding to the disaster, Jakarta City Government has made various efforts to reduce the risk and eliminate the impact. Among other efforts, the most intense activity was the revitalization of house pumping and river normalization in addition to the massive campaigns in order not to pollute the river.

Figure.1.6: River pollution in Jakarta.

3.5 Floods in Jakarta

Jakarta is repeatedly flooded when it rains, but below are some big floods in Jakarta. In February 1960, a flood occurred in a new area of Grogol. Although there are flood-proof plans in the suburbs of Grogol, the area is knee-deep and waist-deep. Another major flood was in 1996 when 5,000 hectares of land were flooded. In 2007, approximately 70% of Jakarta's total area was flooded with water up to four meters deep in parts of the city and at least 190,000 people have fallen ill due flood related illnesses.

Figure.1.7: Flood in DKI Jakarta, 2014 [BNPB]

4.0 BASIC THEORIES

4.1 Hydrologic Cycle

Originally water was constant in quantity and kept moving. There are parts that have been added or lost so far. The same water

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molecule has been transferred repeatedly from the oceans and the soil surface to the atmosphere by evaporation, falls on land as deposition, and is transferred back to the sea by rivers and groundwater. This endless circulation is known as the "hydrologic cycle".

Figure.1.8 shows the hydrologic cycle. The stages of the cycle are: evaporation, transport, condensation, precipitation, groundwater and run-off. In the process, water leaves the atmosphere and falls to earth as precipitation where it enters surface waters or percolates into the water table and groundwater and eventually is taken back into the atmosphere by transpiration and evaporation to begin the cycle again.

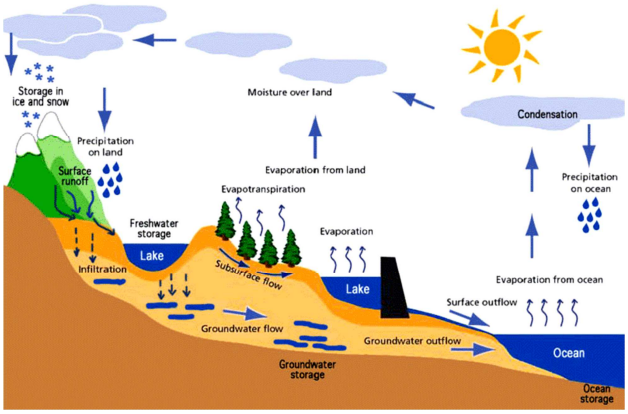

Figure.1.8: Hydrologic cycle [CES]

Evaporation
Water is transferred from the surface to the atmosphere through evaporation, the process by which water changes from a liquid to a gas. Approximately 80% of all evaporation is from the oceans, with the remaining 20% coming from inland water and vegetation [CES]

Transport
The movement of water through the atmosphere, specifically from over the oceans to over land, is called transport. Some of the earth's moisture transport is visible as clouds, which themselves consist of ice crystals and/or tiny water droplets.

Condensation
The transported water vapour eventually condenses, forming tiny droplets in clouds.

Precipitation
The primary mechanism for transporting water from the atmosphere to the surface of the earth is precipitation.

Groundwater
Some of the precipitation soaks into the ground and this is the main source of the formation of the waters found on land – rivers, lakes, groundwater and glaciers. Some of the underground water is trapped between rock or clay layers – this is called groundwater

Run-off
Most of the water which returns to land flows downhill as run-off.

4.2 Debit of Rainfall
The volume of rainwater (V) is the same as the area affected by rainfall (A_{hujan}) in m multiplied by the amount of rainfall (q_{hujan}) in mm.

$$V = A_{hujan} \cdot q_{hujan} \quad (4.1)$$

4.3 Soil Absorption
Theoretically, flooding due to rainfall is due to flow and absorption actors. Flow is related to the ability or capacity of the river, while the absorption is related to the catchment areas or green spaces. The flood is also influenced by the water delivery factor of the buffer zone.

Soil absorption is easily illustrated as shown in Figure 1.9. If the soil is coarsely grained and porous as sand, the water will be absorbed. When rainwater drops the finer soil of the mud, its filtration capacity is reduced. Similarly, when rainwater falls on the clay, it is more difficult to absorb it.

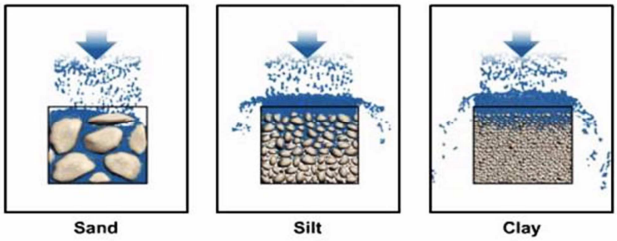

Figure.1.9: Soil absorption

When the rain water falls or well water canal or river water flow on the soil, some water percolates into and moves into inter spaces found between rock particulates as shown in Figure 1.10. The rain water that enters into the soil moves downwards. On its way, it fills up all the capillary spaces found in soil and still moves downwards by gravitational forces till it reaches the water table. Such water that goes downhill in the soil is called gravitational water.

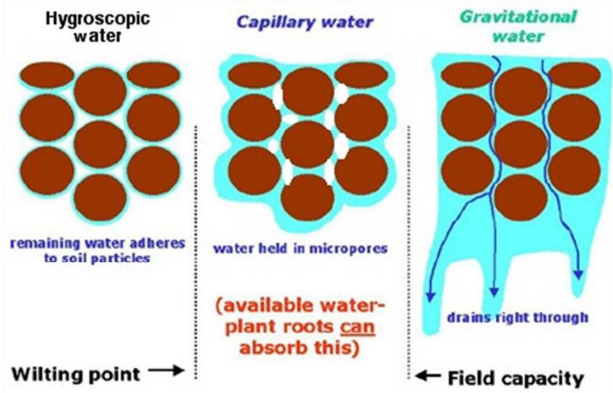

Figure.1.10: Absorption of water

4.4 Levee Dike Concept
A flood-bank or levee dike is an elongated naturally occurring ridge or artificially constructed fill or wall, which regulates water

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levels. It is usually earthen and often parallel to the course of a river in its floodplain or along low-lying coastlines.

Basic layout of levee dike is shown in Figure 1.11 which has components as follows:

1. Design High Water Level (HWL)
2. Low water channel
3. Flood channel
4. Riverside Slope
5. Riverside Banquette
6. Levee Crown
7. Landside Slope
8. Landside Banquette
9. Berm
10. Low water revetment
11. Riverside land
12. Levee
13. Protected lowland
14. River zone

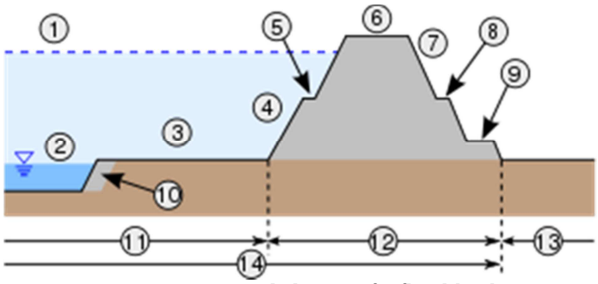

Figure.1.11: simple layout of a flood-bank

5.0 CHARATERISTIC OF RAINFALL IN JAKARTA

As many other cities, Jakarta has many urban problems. One problem is floods. Hazardous, annual floods inundate Jakarta every rainy season from December to February, engulfing tens of kilometers of residential city areas with up to four meters of sewage-infused floodwater for days. Floods occur repeatedly in Jarkarta, usually during the rainy season. This phenomenon indicates a problem in water management in Jakarta. During the rainy season floods are common, while in the dry season water scarcity is a major issue. Effective water management ensures that the excess water during the rainy season does not cause disasters, whereas in the dry season, water that is primarily drinking water is adequately available.

Jakarta is a city prone to flooding with high rainfall resulted in flooding in some areas due to flow and absorption actors. Based on data retrieved from BMKG in 2011-2014, the rain starts in October to its peak in January and February as shown in Figure 1.12 and 1.13. In 2014, the rainfall was peaks at 1075 mm and 26 days. According to the Meteorology, Climatology and Geophysics Agency (BMKG), DKI Jakarta area was medium to heavy rain in February. Data from the Jakarta Disaster Mitigation Agency (BPBD) showed the number of evacuees increased to 18 503. Floods on Tuesday drowned mostly areas in West Jakarta.

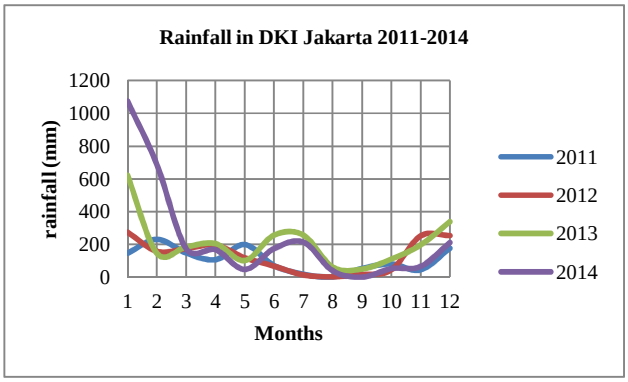

Figure.1.12: Statistic of rainfall in Jakarta in 2011-2014.

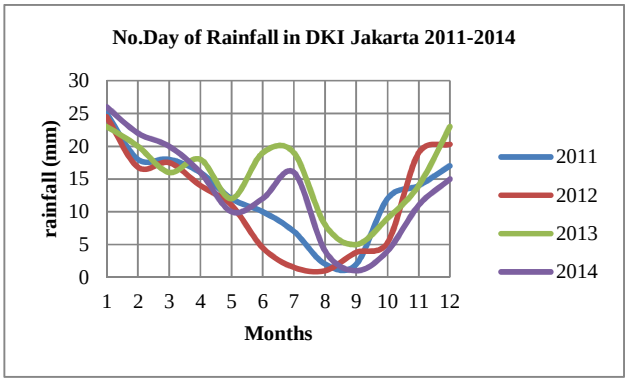

Figure.1.13: Statistic of number of day rainfall in Jakarta in 2011-2014.

Based on data from Indonesian Agency for Meteorology, Climatology and Geophysics (BMKG), in 2015-2016, rainfall in February is in the range of 100-150 mm per day, falling into the category of very dense. Figure.1.14 shows map of the rain distribution in JABODETABEK in 2015. JABODETABEK is an acronym from Jakarta-Bogor-Depok-Tangerang-Bekasi, a megapolitan area of Jakarta and its surroundings.

Under assumption rain evenly throughout Jakarta, the volume of rainfall in Jakarta can be calculated by using equation 4.1. Result of calculation is shown in Figure.1.15.

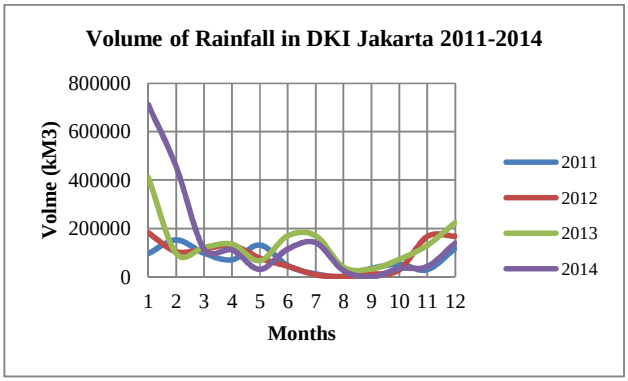

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Figure.1.15: Volume of rainfall map in DKI Jakarta in 2011-2014.

6.0 EXITING REMEDIES

Theoretically, flooding in Jakarta is caused by sea level rise during the rainy season combined with land degradation. On the other hand, floods caused by 13 rivers in towns that flow from the mountains prove a greater problem due to soil surface sedimentation. People living around the river have also contributed to pollution by dumping their daily garbage into the river. In order to optimize the process of river normalization, The Provincial Government of DKI Jakarta may well make the following efforts:

- Build a flood retention basin (levee dike),
- River pumping stations,
- Dredging river regularly
- Developing a culture of clean river through education to the general public through broadcast television, radio, other social media and planting trees around the river,

6.1. Levee Dike

A feasibility study to build a levee dike on Jakarta Bay was carried out collaboration between Indonesia and Nederland. The government has enacted a raft and construction of the Great Wall of the Seas in an effort to prevent future floods as shown in Figure 1.16. The ring dike will be provided with pumping system and retention area, would regulate and control seawater and use also as additional toll road.

The Provincial Government of DKI Jakarta has made several efforts which install heap or river piles for hardening river walls, build new straight lane roads with shortest paths, and build embankments with landfills or concrete walls stretching in flood-prone areas.

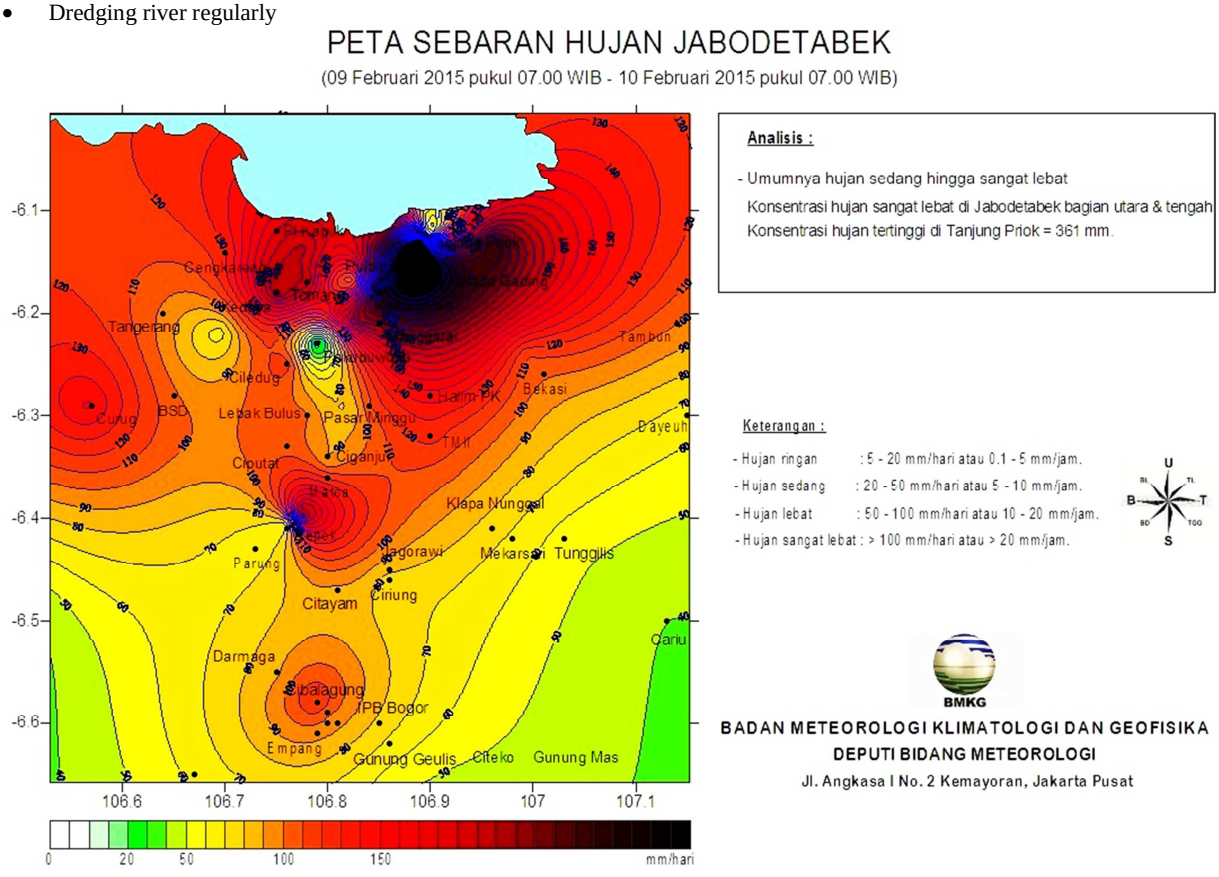

Figure.1.14: Rainfall map in DKI Jakarta in 2015 [BMKG].

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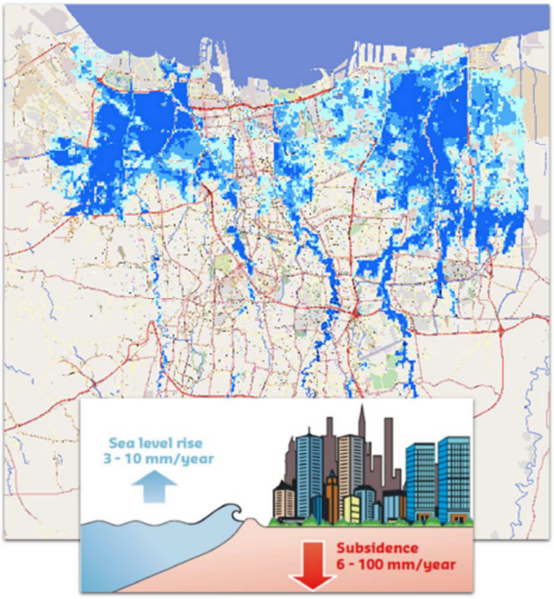

Figure.1.16: Jakarta's water challenges [HCC]

Jakarta Flood Canal
The Jakarta Flood Canal refers to two canals that divert floods from rivers around Jakarta instead of going through the city. The canals divert the water flowing from the south around the city and into the sea. These canals are known as West Flood Canal (WFC) and East Flood Canal (EFC). Other measures to control floods in Jakarta include reservoirs and pumps in areas below sea level.

West Flood Canal
The West Flood Canal marked the southern boundary of the Menteng residential area. The flood canal was included in the 1918 Batavia city plan and constructed in 1919. It runs from the floodgate in Manggarai via Pasar Rumput, Dukuh Atas, Karet Kubur, Tanah Abang, Tomang, Grogol, and Pademangan to the sea at Muara Angke. Another floodgate is located in Karet. Figure.1.17 shows normalization using heavy equipment (excavator) to dredge muddy rubbish sludge in the Ciliwung River, West Flood Canal, DKI Jakarta.

Figure.1.17: Ciliwung River Mud Dredging in DKI Jakarta [DKI Jakarta]

East Flood Canal
The 23.6 km East Flood Canal flows from East Jakarta to North Jakarta. The width of the canal varies from 100 to 300 m. Construction began on 22 June 2002, but has been delayed due to problems in clearing the area. The East Flood Canal is planned to divert the Ciliwung River, Cipinang River, Sunter River, Buaran River, Jati Kramat River, and Cakung River.

6.3. Flood Prevention Water Pumping Stations
As for the next natural disaster prevention measures, Jakarta City Government build a revitalization of house pumping and river normalization. Currently, pumping machines in Jakarta are 446 units spread over 150 pump locations.

Figure.1.18: An example of flood prevention water pumping station in DKI Jakarta [DKI Jakarta]

After the construction of pump houses, management and repair is necessary. All pump houses must be well maintained in order to run well and smoothly when needed. The steps to be taken in the revitalization of pumps include repair of damaged pumps, replacement of used pumps and small capacity, optimizing pump support facilities, optimizing rivers, drainage channels and other waterways to support pump flow and discharge systems.

In addition, work coordination synergies between relevant local authorities are needed to pinpoint potential problems and solve existing problems quickly, improve regular and systematic monitoring and inspection, and ensure the cleanliness of the pump house environment to function optimally for pumping. Maintaining the cleanliness of drainage and drainage channels for pumping free machinery from potentially clogging sewage pumps is a necessity.

6.3. Dredging
River normalization is an attempt to return the river to its original function. Normalization is done when the river condition is shallow. This normalization requires periodically dredging aimed at extending and deepening the river.

Figure.1.19 shows normalization using heavy equipment (excavator) to dredge muddy rubbish sludge in the Ciliwung

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River, Pasar baru area, DKI Jakarta. Dredging is done to normalize the depth of the river so that the flow of water to function normally and to anticipate the danger of flooding in DKI Jakarta.

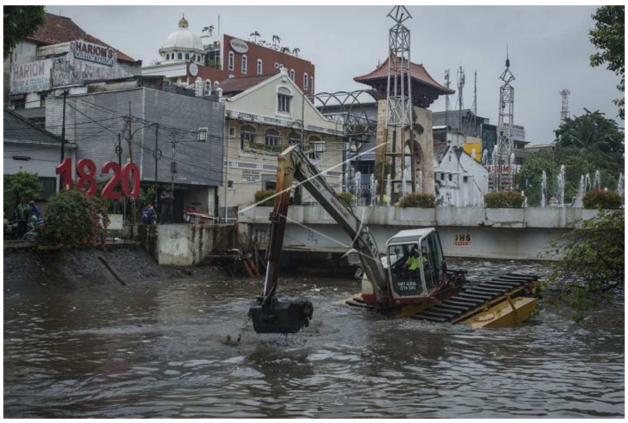

Figure.1.19: Dredging with heavy equipment dredge up the rubbish mixed garbage in the Ciliwung River, Pasar Baru area, DKI Jakarta [DKI Jakarta]

6.3. Proper Flood Management System

The Provincial Government of DKI Jakarta may appoint officers to manage infrastructure and channel facilities. Officers are responsible for dealing with waterways that have the potential to cause flooding or puddles, such as sewerage, clogged sewage and lack of drains. Infrastructure and Infrastructure Handling Officers are assigned based on incoming reports through Qnline application. Qnline is an application that deliberately made by the Provincial Government of DKI Jakarta to be used as a public complaint tool.

7.0 EVICTION OF COMMUNITY AROUND THE RIVER

Although the government has done positive things for flood prevention in Jakarta, but the city government is also doing eviction to the community around the river. Provincial Government (Provincial) DKI Jakarta has a dozen times displacing the existing territory in the capital. The following data collected:

1. Fish Market, North Jakarta

Governor Ahok ensured, on Monday, April 11, 2016 and then displaced the residential area of Luar Batang. The eviction was carried out in three locations in Luar Batang area, namely Aquarium Village, Fish Market, and around Maritime Museum.

2. Kalijodo, West Jakarta

In order to restore the Open Green Room (RTH), the Provincial Government of DKI Jakarta displaces the prostitution and night entertainment area of Kalijodo, North Jakarta.

3. Kampung Pulo, East Jakarta

There are hundreds of homes in Kampung Pulo evicted by the Provincial Government of DKI Jakarta. These evictions were carried out in order to normalize Ciliwung's normalization program.

4. Bidaracina, East Jakarta

Bidaracina became the target of eviction by the Provincial Government of DKI Jakarta, Bidaracina area is affected by normalization of Ciliwung River because it will be made sodetan.

5. Bukit Duri, South Jakarta

Jakarta Provincial Government displaces 97 houses in Bukit Duri, Tebet, South Jakarta. The reason, the building is on the lip of the Ciliwung River to be normalized.

Figure.1.20: he rest of the house from the evictions of residents on Bukit Duri.

The eviction done by DKI government has caused the rejection by masyaratkat so as to create new problems such as, politic, deprivation, homeless, and others. Some of them sued through the courts like citizens of the thorns. The result of their efforts to win those who the Central Jakarta District Court ruled that the DKI Jakarta Provincial Government and several other defendants were required to pay material damages of Rp200 million each to 93 RW 10, 11 and 12 Tebet, Bukit Duri, South Jakarta.

6. Pinangsia, West Jakarta

Pinangsia RW 06 village has three kampongs namely Kunir RT 04, Balokan RT 05 and RT 06 in Kecamatan Tamansari West Jakarta. Kampung that has existed since the 1970s is all located on the outskirts of the river Anak times Ciliwung.

7. Kemayoran, Central Jakarta

Evictions in the area of 1000 M2 in Ketapang Kebon Kosong, Kemayoran, Central Jakarta was executed Security and Order (Trantib) combined Central Jakarta.

8. Pluit Reservoir, North Jakarta

Pluit's normalization project that has been running since 2012 has successfully dismantled 7000 housing units from 10,000 units of existing houses.

9. Menteng Dalam, South Jakarta

A total of 185 illegal buildings on a 500 meter water channel at Jalan Menteng Pulo, RT 05 RW 14, Menteng Dalam, South Jakarta, are controlled by the Civil Service Police Unit (Satpol PP).

10. Krukut River, Central Jakarta

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Hundreds of illegal buildings standing on the riverbank of Krukut, North Petojo, Gambir, Central Jakarta, were forcibly demolished by Satpol PP officers on Wednesday, September 30, 2015. The demolition of more than 250 illegal buildings is deliberately done by the Provincial Government of DKI, in order to normalize the times of Krukut which has been full of garbage due to the number of illegal buildings

11. Rawajati, Kalibata, South Jakarta.
Evictions were carried out on Thursday 1 September 2016. Residents of RT 09 RW 04 Rawajati Sub-district, Pancoran Sub-district, South Jakarta were evicted with the mobilization of 250 personnel.

8.0. JAPANESE'S RIVER CULTURE

In Japan, society and its government have a very good culture in treating the river just call Japan River Culture. This indispensable habit is needed to reduce river pollution, thus facilitating the flow of river water into the sea.

8.1. Tree along Rivers

One of them is the Japanese government planted tree trees around the river mouth as shown figure.1.21. The purpose of this tree planting is to strengthen the river mouth from erosion caused by river flows during the rainy season. In addition, it will provide the beauty of the city and the perfection for the past community along the river.

Figure.1.21: Kashio River in Yokohama, Japan

8.2. Hanami (Flower Viewing) along River

Hanami (Flower Viewing") is the Japanese traditional custom of enjoying the transient beauty of flowers. The practice of hanami is many centuries old. The custom is said to have started during the Nara period (710–794). Some Japanese celebrate hanami along the river such as in Kyoto. They enjoy the beauty of various flowers when springing along the Kamo river. The riverbanks of the Kamo River are popular walks for residents and tourists alike. In summer, the restaurant opens a balcony looking over the river. There is a path that runs along the river where one can walk along the river, and some stepping stones that cross the river.

Figure.1.22: Hanami parties along the Kamo River, 2005, Yokohama, Japan.

8.3. Playing-Green-Clean River Education

Japanese society has been taught clean and orderly since early childhood when still a child in school. So even on holidays, many Japanese people go out on a riverbank while playing, frying and eating, and so on, but they keep the greenery and the cleanliness of the river.

Figure.1.23: Playing, keep green and clean along the Kashio River, Yokohama, Japan.

8.4. Structuring House and Mansion along the River

In Japan, cleaning and dredging rivers is not done by evicting the homes of the inhabitants, but by structuring the architecture, the structure, the strength of the construction of houses, apartment and mansion. This arrangement sees many aspects such as:

- Safety,
- Free from flood hazard,
- Cleanliness,
- Beauty,
- Greenness
- Resilience of building and dam infrastructure,
- Effectiveness,
- Creativity of innovation,
- Accessibility of transportation,
- Equality and justice for society

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Figure 1.24 & 1.25 show mansions and houses and along the river is arranged in such a way that they look beautiful, clean and fascinating.

Figure.1.24: Structuring Mansion along the Kamo River, Yokohama, Japan.

Figure.1.25: Houses along the Kamo River, Kyoto, Japan, Japan [Alamy].

5.0 CONCLUSION

In conclusion, this paper discusses on pro and cons the Jakarta government's plan for flood prevention.. Positively, Jakarta government has done some good policies such as the development of flood retaining spaces, dredging activities for shallow water rivers, water pumps development and management team. On the contrary, the government has made an arbitrary eviction to the communities located around the river, causing humanitarian and political issues. It has found that Japanese River Culture is suitable to be applied in DKI Jakarta, because

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