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Urban river governance through community movement to increase the adaptive capacity to climate change of the poor: a case study of Yogyakarta

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Urban river governance through community movement to increase the adaptive capacity to climate change of the poor: a case study of Yogyakarta

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Abstract. This paper explains how the community movement governed the urban rivers' climate adaptation using the case of Yogyakarta's three main rivers. Before, these areas were prone to floods and disease outbreak. The Sultan Ground and private owned land statuses by the riversides created difficulties since many urban poor in this city lived in these areas. The local authority supported the poor through community engagement. This scheme resulted in a breakthrough. The communities there became more aware of the misuse of rivers. They proactively participated in the discussions and initiated a movement to conserve the riverside areas. The urban river governance proceeded both bottom-up and top-down approaches. This case used the explanation with purposive sampling derived from a list of related informants. The primary data was acquired through snowballing interviews, while secondary data was obtained from related stakeholders' archives. Both types of data were collected to understand the multilevel governance structure within the stakeholders' collaboration context. The movement resulted in better city planning. It reduced the vulnerability of the poor, while increasing their adaptive capacity to climate change. Using Yogyakarta as a case, this paper adds to the knowledge of urban resilience strategy in developing countries.

Keywords: adaptive capacity, climate change, poverty reduction, urban rivers governance, Yogyakarta

1. Introduction

Urban river governance comprises a wide range of actors, which are organizations from across public, private, and voluntary sectors. It is the product of the incorporation of the ecological, economic, and social knowledge that is essential to achieve their [1]sustainable management [1]. In this paper, the urban river governance is connected with sustainable adaptation management, since both have inter-relation at the process stage. In studying the urban river governance, sustainable adaptation management comprises both top-down and bottom-up perspectives. It is to examine whether different sub-elements of policies support or undermine potential adaptive responses [2][3].

The Kyoto Protocol and Paris Agreement of United Nations Framework Convention on Climate Change (UNFCCC) are regarded as the global policy framework of adaptive capacity [4][5], while climate change adaptation policies are implemented on a local scale [6][7]. Many climate adaptation researches the impact and adaptation assessments through the bottom-up approach; they investigated



the past to the present, called: ‘learn from the past’ [8]. Meanwhile, it is also important to use a specific decision-making framework based on the prediction of physical impacts/future impact [8], known as the ‘top-down’ approach. As climate adaptation policy, both bottom-up and top-down approaches covered vulnerability and adaptive capacity, while bottom-up approach includes resource and technologies, top-down approach provides a better understanding to world development, GHG, global climate model, regionalization, impact, adaptive capacity, and vulnerability. Both are complementary regarding forming the policy [8].

This paper aimed to explain how the urban rivers were governed towards climate adaptation using the case study of Yogyakarta, Indonesia. In Yogyakarta, the urban rivers are governed through community movement. There, the urban river governance is based on not only the top-down approach of the National-to-Local governments but also the bottom-up approach that includes the poor community participation in the decision-making activities in the city.

In response to the environmental degradation as the problem of their riverside areas, the City of Yogyakarta has incorporated community into its development planning process. Here, a community means a group of people with diverse personalities who are interconnected by social ties, shared common perspectives and engage in joint action in geographical locations or settings [9]. In this research, the community is interpreted as all of those who affected or will be affected by the results, or those who live as residents of the riverside.

Yogyakarta is a city on the island of Java, known for its traditional arts and cultural heritage. Yogyakarta City was selected because of its unique characteristics, and the phenomena happened inside. Yogyakarta is the only province in Indonesia that has a Sultan as the Governor who leads the Province. The Sultan of Yogyakarta leads two organizational structures. As a King, Sultan leads a kingdom and has Keraton (The Royal Palace) structural organization that consists of the Expert (*Pandhita Aji*), the Councils (*Sri Palimbangan*), and some lead Ministries.

On the other hand, as a Governor, the Sultan also leads a “common” structure organization of governmental institution of a Province, such as the Vice Governor, Regional Planning, Inspectorate, Legislators and Regional Secretariat, City Mayors, Government Agencies, and Governmental Bodies. Until now, Yogyakarta is led by the dynasty of Hamengku Buwono (HB). Sultan Hamengku Buwono (HB) X currently leads the monarchy.

The two organizational structures also impact their land statuses. Yogyakarta is the only province that has more than three land statuses. Other Provinces in Indonesia usually have three land statuses: Private Owned (*Sertifikat Hak Milik-SHM*), State Owned (*Tanah Negara*), and Building Rights or *Hak Guna Bangunan* (HGB). The first status is owned legally by private companies or individuals, the second consists of municipal offices, district and sub-district offices, ministerial offices, government-owned hospitals, armed forces offices, fire departments, airport, Riverside, and the last is lent to private companies or individuals.

However, in Yogyakarta the land statuses are different. As the Sultan mentioned in an interview with Tempo media, “*Hasil Paliyan Nagari kok Tanah Negara*” (tempo.co) translated as the results of Sultanate’s division is not government land. In Yogyakarta, there is no State Owned (*Tanah Negara*). All of the lands in Yogyakarta belong to the Sultanate.

Therefore, the lands in Yogyakarta are divided into two types: ‘Crown Domain’ (*Kroondomein-Tanah Keprabon*) and ‘Sultan’s Ground’ (*Rijksdomein-Tanah Kerajaan*). The ‘*Tanah Keprabon*’ is part of the Keraton government territory holistically so that it is not transferable or inherited, since it contains royal symbols, such as Palaces, *Alun-Alun* (Squares), Mosque, Taman Sari (Palace for Leisure), country-owned villas and supporting buildings. Meanwhile, Sultan’s Ground is the land owned by the Sultanate that is given or leased and allowed to be used by the ordinary people. It includes houses for non-crowned princes, houses for high-level employees, as compensation for employees, lent-status to employees, and lent-status to foreign people. The statuses of these lands were legalized by Domein Verklaring Rijksblad Kasultanan document in 1918 No. 16 related to a document in 1925 ^[1]_{SEP} No. 3:

“All of the land in Yogyakarta belong to me, the Sultan.” The Dutch Colonial Government (Governor Lucien Adam) legalized this statement in 1940. The first Indonesian President (Ir. Soekarno) also legalized this through the Constitution (UUD) article no. 18b on indigenous rights and the Law (Undang-undang) No. 3/1950 about the special status of DI Yogyakarta [10].

The Government of Indonesia (GoI) granted a special autonomous status to Yogyakarta because of its alignment with the Republic during the pre and post-independence periods. Before the independence, the Sultan was known as the main supporter of the rebellion against Dutch and Japanese invaders. After the Indonesian Independence, the Sultan of Yogyakarta helped Indonesians on battles against the NICA (*Netherlands-Indies Civiele Administratie*) troops that flew to Indonesia to re-occupy the country soon after their independence.

Today, most of the riverside areas in Yogyakarta are considered Sultan’s Ground. Each of this Sultan’s Ground land has “*surat kekancing*,” a legal letter from the Sultanate that provides information regarding the status of the land, written in Javanese’s Sanskrit letters. In general, Sultan’s Ground has a size of 19,400 hectares (ha) or around 6.36% of the Province’s size, while the size in the City is 104.94 hectare (ha) or around 0.03% of the City’s size [10]. It means the GoI could not provide ‘proper’ programs since those areas belong to the Sultanate.

As time goes by, Sultan’s Ground creates glitches. Most of the poor of Yogyakarta also reside in the riverside areas. They already inhabited those areas from generation to generation, and some already lived there before the Republic existed. As happened in many other places, the land price and the rental cost of the buildings located in the riverside areas are also considered ‘cheap.’ Moreover, they are located in the strategic areas of the city center, which made the poor reluctant to move from those areas. All of them have an authentic “*surat kekancing*” letters from the Sultan, which means they could live there because they hold the permit from their king.

Like in other areas in Indonesia, riverside areas in Yogyakarta are prone to disease outbreak. Malaria, cholera, and dysentery are some infectious diseases found in these riverside areas. It is because the rivers are not clean and containing garbage. In the aftermath of the floods, riverbanks areas are susceptible to a range of disease-causing insects, such as cockroaches, mosquitos, and flies that swarm on a pile of garbage carried by the flood and spread diseases to the people. The residual water also causes the spread of mosquitoes that cause malaria and dengue fever.

The riverside areas are also considered prone to disasters, such as flash floods and landslides. Disasters at the river threatened the lives of people dwelling on the banks of the river. Regarding the direct impacts, the flood flows into their homes and causes damages. They also have to save their goods and valuable things inside their houses to a higher ground. During the rainy season, most of the activities in the areas are hampered due to the annual floods and muds.

A lot of poor of the riverside have occupations related to the outdoor area. Some of them work as parking guards in nearby stores, *ojek* (taxi motor), taxi drivers, *becak* (three-wheel bicycle taxi) drivers, while some of the female work as storekeepers, housemaids, or massagers. These outdoor type jobs are also hampered during the flood.

For the indirect impact, the heavy rains will decrease the amount of tourist visit, which means the reduction of the income of the tourist workers. The artwork and handicraft painters are also affected by the severe impact of heavy rains since, usually, they have to dry their art products in the direct sunlight. The change in temperature will also impact the foods and culinary industries. It reduces the demand for foods and drinks for several reasons, as the flood made the location unsanitary, and this condition prohibits them from producing culinary products. It will also impact the poor who are the restaurant, culinary workers, and food factory workers since the halted production will reduce their income.

2. Methods

This research selected the ‘case study’ research design to investigate the urban river governance. Yogyakarta City is chosen as the case study, especially the urban riverside settlements, where most of the poor reside (figure 1). The study used the explanation from purposive sampling derived from a list of related informants. The primary data were acquired through snowballing interviews, while the secondary data used related stakeholders’ archives. The sample consisted of various groups from diverse expertise. Most of the informants in this research were experts in their fields. Each of these informants was asked to mention the name of the organization or community group and the contact person of the mutual collaboration of programs related to this research subject.

The government officers and government agency staffs’ understanding of these features were the selection criteria. They belonged to the government group informants’ category. Besides these government officers, we also selected city leaders. The mayor, vice mayor, or former mayors were included as key informants since they embedded the urban river governance approaches in the management of the city. The city leaders were included as government group informants’ category since they actively worked or ever worked as the governor’s staffs.



Figure 1. Yogyakarta city map, the place of its rivers (Winongo, Code, and Gajahwong, and the area of the poor group. The area of the poor in Yogyakarta is hatched by red colour. The darker the colour, the more poor people live in the area. It indicates most of the poor reside at the riverbank of the rivers.

In this research, we also selected the community and expert groups as the informants. They were essential because they already conducted activities in the field. A civil society group, such as an institution, can facilitate effective climate change adaptation and poverty reduction (Dodman and Satterthwaite, 2008). They also represented the poor community in some areas within this research’s cases. People of the poor community were important informants because they were the objects of the programs. They received the benefit and impact of the programs.

All qualitative data (files, photos, and interview transcripts) were analysed through ‘Atlas.ti’ to see the patterns and relationships, and to make general findings of the phenomena. The results were coded into a matrix to fit the parameters. The data series were gathered within the time limitation (from 2006

to 2016) and explained in tables and graphs to simplify the process. Both the results of the analysis would then be summarized and cross-referenced for the triangulation method using 'Atlas.ti' to check the relationship.

3. Result and Discussions

Sustainable adaptation in Yogyakarta was implemented in both the strategic planning and action of the government, and acted as a program to improve the quality of life of the poor. In other areas in Indonesia, ex-situ (relocation of the poor housing) was considered as the only way to improve the poor's quality of life. A national law (*Peraturan Pemerintah-PP*) number 38/2011 about the river states that every river should have a standard of three meter wide of river setback. Three meter wide is the minimum standard for one car plus one motorcycle lane where ambulance and fire fighter cars can enter the area. It is regulated to make the government able to monitor the condition of the river. In some areas, this standard is considered challenging to have a river setback, since those areas were built in organic form, without adequate information about the standard minimum requirement for the river setback.

Meanwhile, in Yogyakarta, the informants mentioned in-situ (revitalization) stood as the concept of the local government. The Regional Spatial Plan (RT/RW) of Yogyakarta stated the focus of the program to all of the uninhabitable areas located next to all urban riverbanks. Until the end of 2011, there were 1,979 uninhabitable houses, with 200 units of annual house improvement programs along these riverbanks. These areas did not have proper infrastructures. There are three main rivers in Yogyakarta: Winongo on the west, Code in the middle, and Gajahwong on the east side. Each has a community that mostly consists of the local poor. There is FKWA-*Forum Komunikasi Winongo Asri* (Winongo Communication Forum) in Winongo, PKC-The *Pemerti Kali Code* in Code, and *Komunitas Gajahwong* at Gajahwong.

3.1. City Planning in Yogyakarta

The local authorities sustained the quality of life of the poor community in the riverbank areas. It can be seen in their sustainable adaptation program. The informants mentioned that the implementation of sustainable adaptation relied on strategic planning (*Renstra*) document of the Environment Agency (BLH). It consists of two strategies: 1) to increase the empowerment through community participation, and 2) to increase the capacity of human resources and strengthen environmental institutions.

To implement those strategies, authorities conducted community based economic and regional development programs through cooperation with related agencies. Some of their programs included: 1) controlling the water pollution in the river, 2) controlling the climate change impacts, 3) increasing participation, education, and access to public information in controlling the environment, and 4) delivering community-based solid waste management.

Beside the *Renstra*, it is also necessary to view the general strategy of the local authorities itself. The city management program of Yogyakarta known as 'citizen empowerment; or in the native tongue: "*Segoro Amarto*" movements, stands for "*SEmangat GOtong ROyong Agawe MAjune ngayogyakartaRTO*," which means the spirit of mutual help among neighbours in a community to achieve the sustainability in Yogyakarta. It was a noble idea from Sultan HB-X to empower the society. It also addressed poverty reduction in an integrated manner, which was implemented by the local government. This way, the poverty reduction become the responsibility of not only the poor households but also all of the people of Yogyakarta.

Another strategy targeted micro (sectorial) policy of construction. In Yogyakarta, the implementation was seen through the built of *Rusunawa* (government owned rental housing). We found two types of *Rusunawa* in which both were built on Riverside (SG) and served the poor nearby their original living settlements area. The SG is located directly by the river body, while the slums are located adjacent to

the SG. Their names are ‘*Rusunawa Cokrodirjan*’ and ‘*Rusunawa Bina Harapan*.’ Both building complexes indicated the program implementation of the local authorities to support the living condition of the riverside poor of Yogyakarta.

Rusunawa in Yogyakarta itself was based on the national law (*Undang-Undang*) No. 20/2011 about the apartments for the low-income groups. 20% of the development area should be dedicated to the poor, to make them able to have decent places to live. They were built on the Sultan Ground (SG). The city planning was implemented through Mayor’s Decree (*Perwal*) no. 65/2014 about the Task Force of *Rusunawa*, but before it was through *Perwal* no.17/2007 on Local Medium Development Plan.

Beside *Rusunawa*, the informants also mentioned that micro sectorial policy in construction was implemented through ‘KOTAKU’ Program (*Kota tanpa kumuh*-cities without slum). It was described as the implementation of ‘100-0-100’ program (100% water – 0% slum – 100% sanitation). It consisted of physical and infrastructure improvements at the riverside, such as pavement with ‘*biopori*’ (water infiltration hole), drainage system, green roofs or pergola, plant boxes, and flood barrier zone. Although some of these infrastructures were not related directly to slum upgrading, they contributed to tackling climate change problems while the flood barrier and drainage systems were used to minimize the flood for the slum.

3.2. Community Participation

There was also an indication that poor communities in Yogyakarta were more proactive to participate in city development activities than other Indonesian cities. For example, one of the communities, the FKWA initiated the M3K movement (*unggah, mundur, madep*-construct upwards, set back, and face the river). The M3K existed since before the KOTAKU Program, which was considered as a movement to support the city’s sustainable adaptation program. This movement was aimed to conserve the riverside area and in-line with the spatial planning program of the government. The M3K was inspired by the ‘*segoro amarto*’ movement (collective action), which instilled the values of self-reliance, awareness, discipline, and togetherness.

There were some examples of M3K implementation. In Karangwaru Sub-District (figure 2), it presented the ‘*unggah*’ or upward implementation that included the river set-back as active green open space. The riversides were installed with street furniture using self-help funding scheme from the community and they also used the open space as a temporary gathering location, which had a double function for river condition monitoring. The community also used the space for simple economic activities, such as opening up food stalls. The M3K was aimed to open the mind-set of the communities, which in the old days used the river as ‘public toilet’ to become a clean public place for all to use.



Figure 2. The implementation of M3K: '*Munggah*' (upward) at Karangwaru Riverside, Yogyakarta

Another example of M3K implementation in Gowongan Sub-District (figure 3) presented the '*mundur*' or setback implementation. All buildings attached to the riverbank were pushed back to make room for inspection road at 3 meter wide. The road was used for all kinds of activities, but its primary function was for the river condition monitoring, also for fire-fighter truck and ambulance to get through the *kampung*.

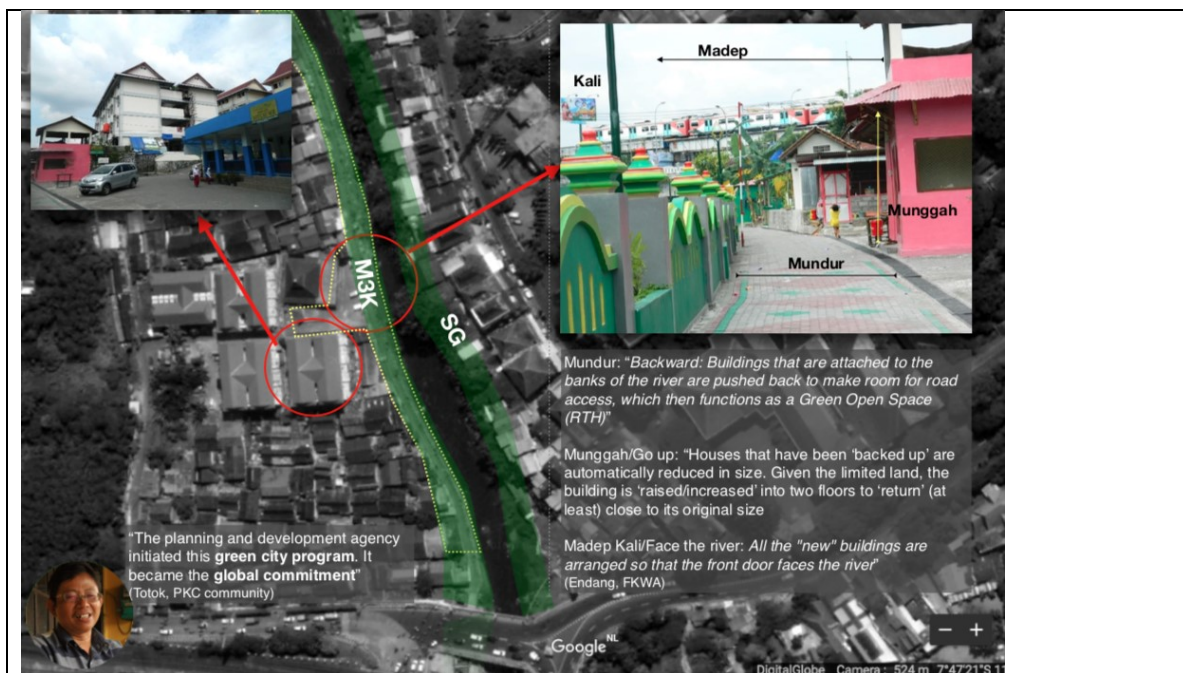


Figure 3. The implementation of M3K: '*Mundur*' (setback) at Gowongan, Yogyakarta

The last one was at Ngampilan Sub-District (figure 4), which implemented the '*madep*' or facing the river. In all the new buildings, the front doors faced the river. In 2014, a fund from the government (IDR 2 Billion equal to USD 142,800) was granted to implement the M3K through community-based housing development program (Public Works Regional Agency).



Figure 4. The implementation of M3K: '*Madep*' (facing the river) at Ngampilan, Yogyakarta

The M3K gained momentum as an asset for the city sustainability movement. Now, the informants mentioned that Jakarta government (Governor Anies Baswedan) needed to adapt M3K to the riverside areas in Jakarta. The M3K became the part of RPJMD (mid-term plan) and the new urban agenda of Yogyakarta. The results of Habitat 3 in Quito, 2018 also coined this as part of SDG #11 (sustainable cities and communities).

Therefore, overall, climate adaptation in Yogyakarta consisted of the culmination of program stages from National (zero slum and RAN-API), Local (quality of access to housing, access to infrastructures, and waster collection), and community (M3K movement). All stages covered the natural and physical capitals also mitigation/adaptation, to raise awareness between stakeholders and provide more open space in the riverside.

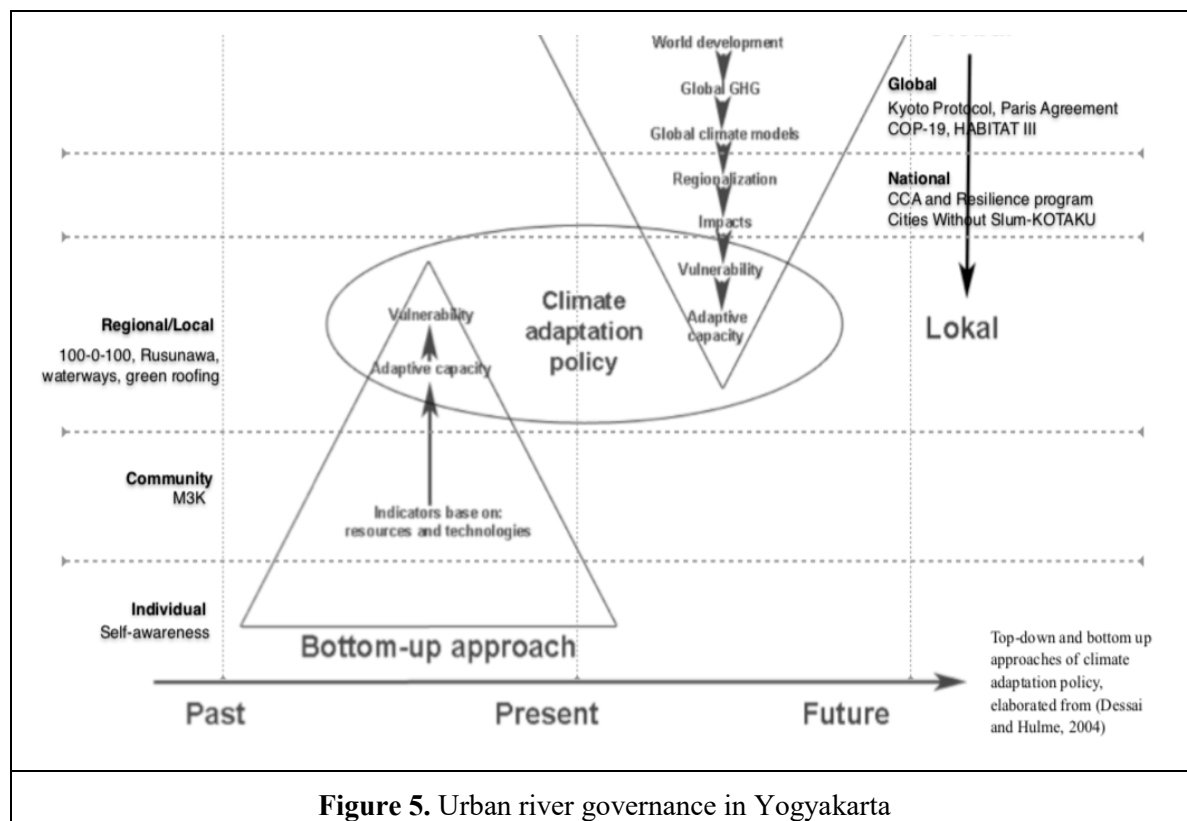


Figure 5. Urban river governance in Yogyakarta

Urban river governance framework in Yogyakarta visualized above (figure 5) consists of temporal scales (past, present, and future), bottom-up and top-down approach, where the implementation is located in the multi-governance structure. The top-down the approach starts at the global level (Kyoto Protocol, Paris Agreement, COP-19, Habitat III) and national level (Climate change adaptation and resilience program, KOTAKU cities without slum). At the local level, the governance is implemented through 100-0-100 and *Rusunawa* programs, while at the community level it is implemented through M3K movement.

4. Conclusion

The urban river governance through community movement process is successful in Yogyakarta since it provides active participation of the poor. Therefore, community engagement plays a significant role in increasing individual self-awareness. The study indicated that both bottom-up and top-down approaches were significant in delivering better result of climate adaptation policy.

Meanwhile, the land status problem needs to be solved immediately since it creates obstacles to implementing climate adaptation programs. The M3K movement is a supplemental element, which resulted in better city planning and environmental protection significantly. It reduces the flood impacts in the city, and consequently reduces the impact of climate change. Overall, the conservation of the riverside area contributes to the enhancement of the adaptive capacity of the poor to cope with the impact of climate change.

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