TOO MUCH- TOO LITTLE- TOO DIRTY WATER *Indonesia*

Last December, our group embarked on a field trip to Yogyakarta and Jakarta in Indonesia, delving into the intricate nuances of water governance in these regions. This firsthand exploration provided us with a unique and insightful perspective on the challenges, innovations, and collaborative efforts shaping the dynamic landscape of water management.

Fig 1. Mt Merapi area

"During our pre-trip seminars, we were introduced to the thought-provoking quote, 'Too much, Too little, Too Dirty water.' This phrase lingered in our minds as we embarked on our journey to Indonesia, its inherent contradictions sparking our curiosity and offering insights into the complex issue of water governance in the country. At first glance, one might assume that a tropical nation like Indonesia, blessed with abundant water, would not grapple with shortages of clean water. However, this quote merely scratched the surface of the intricate challenges surrounding water governance in Indonesia.

Our firsthand experiences on the trip revealed that the water governance issues in Indonesia extended beyond mere water management problems; they encompassed a nexus of political, housing, and various other interconnected challenges. In essence, the quote served as a mere glimpse into the broader, multifaceted landscape of issues awaiting our exploration."

Fig 2&3. Teammates and Prof.Navarun

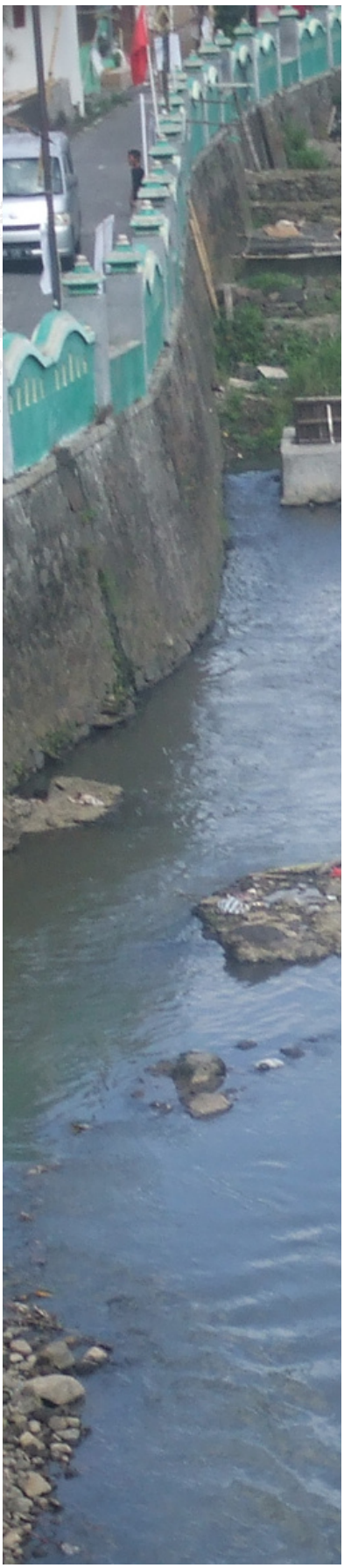

Fig 4. River bank of Kali Code

KALI CODE

Embarking on our journey along the enchanting Kali Code, a river that gracefully winds through the heart of Yogyakarta on the vibrant island of Java, Indonesia, was an eye-opening experience. As we strolled downstream, immersing ourselves in the lively neighborhoods of Jogja, we couldn't help but notice the challenges faced by the local residents living in such close harmony with the river.

The tranquillity of the river's flow belied a pressing issue - water scarcity. Despite the river's proximity, the communities grappled with this persistent problem, amplified by the bustling population that lined its banks. Delving deeper into the issue, it became apparent that the residents themselves were inadvertently contributing to the water scarcity dilemma.

The culprit? A long-standing habit of disposing of waste directly into the river. This unwittingly perpetuated water pollution, turning a once-thriving water source into a contaminated resource. The consequences were stark – the river's water resources were now deemed unusable. Astonishingly, a noticeable indifference seemed to permeate the air, leading to an alarming increase in the continuous disposal of waste into the once-pristine river. It was a disheartening cycle, a self-reinforcing loop that only intensified the pollution of this once-idyllic waterway.

Yet, amidst the challenges, communities have risen to the occasion, implementing various waste management initiatives aimed at curbing the disposal of waste into the river and staunchly battling pollution.

One notable illustration is the waste bank initiative, wherein community members actively engage in segregating their waste at its source and depositing recyclable materials at designated waste banks within their locality. These waste banks then vend the collected materials to either intermediate recycling collectors or a central waste bank, subsequently enabling residents to receive a monetary reward. Cokrodiningratan stands out as a prime example of success in this regard.

The introduction of the waste bank to Cokrodiningratan in 2006 initially encountered resistance from some residents. However, the community leaders, driven by a heightened awareness and concern for water-related issues, persisted in their efforts to implement the waste bank concept. Their consistent dedication eventually led to significant success, earning the community the distinguished recognition of being the cleanest in the region.

Fig 5. One of the waste management initiatives —— tower made from plastic wastes

Fig 6. Children from Cokrodiningratan community

During our stroll through the community, a striking absence of litter on the ground was evident, underscoring the community's commitment to cleanliness. Additionally, we observed garments crafted from recycled waste, showcasing a tangible and creative outcome of the community's dedication to sustainable practices.

Yet, despite the strides made, water management projects are still grappling with considerable constraints, with benefits primarily reaching a select few villages whose leaders champion water-related causes. Unfortunately, numerous other villages either allocate meager resources to waste management or initiate projects that fizzle out left abandoned after a fleeting stint. Additionally, when construction works occur along the Kali code, the rubble from the construction is allowed to enter the Kali code. This also severely affects the water quality. We are still faced with a prolonged journey ahead to make significant headway in addressing the pollution concerns plaguing the Code River. The road to improvement is still winding, demanding sustained efforts and collective commitment.

KALI CILIWUNG

Our second stop was Kali Ciliwung which is just one of the many rivers that run through Jakarta. There we interacted with the Ciliwung Depok community which diligently tries to educate the community by teaching the 3Rs (Reduce Reuse Recycle) and by physically removing the rubbish from the river. However, they highlighted that due to the inadequate and inconvenient waste management system in communities, people are more inclined to dispose of their waste in rivers.

KALI CODE COMMUNITIES

"Education cost money, so does ignorance."
----- Claus Moser

Additionally, we observed that the construction site nearby does not have an effective sediment management system and sediments are discharged into the river. The Ciliwung Depok community commented that these issues have been brought to the attention of the government, but as of now, no action has been taken. This showcases that the inaction and insufficient support from the government have an impact on water governance even if it is community-led.

The lack of enforcement as seen in Kali Ciliwung is not an isolated case as seen in Kali code. Both rivers face the problem of sediment from construction entering the river and polluting it.

The lack of government support, inaction and enforcement makes it exceedingly challenging to make significant progress in resolving this issue of water pollution as the community can only do so much with their limited resources and authority.

Fig 7. Talk given by Ciliwung depok community

In Kali Ciliwung we also were able to understand the complex issue of managing floods in Jakarta where there are 2 competing policies namely, Naturalisation and Normalisation.

> ***Naturalisation***
-Allow for green spaces and utilisation of river bank for leisure and economic activities
-Requires more relocation of existing residences due to the gradual increase needed

> ***Normalisation***
-Requires less relocation of existing residences due to steep walls
-Greater Carrying capacity
- Requires dredging and maintenance
-Needs to be continuous from downstream upwards for it to be effective

We concluded that the lack of success in flood mitigation downstream is attributed to the inconsistent implementation of both normalisation and naturalisation practices. While each procedure individually helps in flood control to a certain extent, they need to be implemented in full.

Fig 8 (up). Collapsed wall pieces made for normalisation
Fig 9 (down). Bamboo stairs made for naturalisation

Fig 10. Normalisation and naturalisation in each side of river bank

•The current discontinuity of walls proves ineffective in preventing floods as in the presence of walls upstream leads to higher carrying capacity in places with walls resulting in more water flow downstream resulting in floods downstream. In addition, the lack of maintenance also results in the walls falling into disrepair. (Normalisation fails)

•The presence of walls in some places but not all also disrupts the natural environment's ability to act as a floodplain and absorb water, thereby reducing the effects of a flood. (Naturalisation fails)

Fig 11. Trash in the river

The inconsistent full implementation of only one out of these two policies is due to what can be seen as both policies being unsuccessful by different stakeholders as their expectations for a flood management policy are not met. Furthermore, the issue of these 2 policies is also highly political, sharply divided along party lines. This results in the continuous flip-flop of policies resulting in a waste of resources and a lack of success in flood management.

Fig 12. Community living near the seawall construction

THE GIANT SEA WALL

Fig 13. Construction of the seawalls

The last station of our field trip is the giant sea wall, where we engaged in a focused group discussion with personnel from the Ministry of Public Works and Housing. An added highlight was the opportunity to hop on a boat for a close-up examination of the sea wall itself. This colossal structure is Jakarta's response to the ongoing threat of rising sea levels and the resulting land subsidence. Taking a cue from the Netherlands' construction expertise, Jakarta has adopted a similar approach to erect a formidable seawall.

While the seawall plan proves generally effective in safeguarding Jakarta against rising sea levels amid climate change, the construction process faces challenges due to a complex political climate, insufficient funding, and coordination issues among various stakeholders. These factors contribute to a sluggish construction pace, extending the timeline for the project to reach full implementation and effectiveness.

Fig 14. The giant seawalls

THE COMMONALITY BETWEEN THE 3 DISTINCT WATER BODIES

Based on our interactions with community leaders, we learnt that a commonality between the 3 distinct water bodies that was affecting the water governance was the issue of relocation.

Fig 15 (left). Vertical housing for relocation of the residents
Fig 16 (right). Illegal structures near the river bank

In all 3 of these, the relocation of residents was hampering the execution of government policy to solve the issues that were plaguing the community and the water bodies. In Kali Code and Kali Ciliwang, residents were supposed to be relocated to protect them from flood risk and reduce pollution of the river and for Kali Ciliwang to allow for the enactment of flood management strategies such as normalisation and naturalisation near the coast to allow for sea wall construction to protect against sea level rise due to global warming and land subsidence.

However, the lack of effective and inclusive relocation policies has hampered these efforts this prominent distinction can be seen along the downstream Kali code where the different is as clear as night and day where one side of the riverbank inhabited by locals has managed to follow the policy of setting back housing by 3m from the riverbank by relocating the locals to rusunawa while those on the other bank who are migrants are not included in this housing policy. In Jakarta, this problem can be seen in the difficulty of implementing policies such as normalisation and naturalisation and the Great Jakarta sea wall.

These policies also require the relocation of people residing nearby to vacate the area for construction. However, there is no place to relocate the people: Jakarta is already overwhelmed with the high population density. The government suggests that landowners return to their properties, while migrants are encouraged to go back to their places of origin. The absence of suitable relocation sites which also takes into consideration the resident needs for the water bodies for economic and recreational activities, not only amplifies residents' reluctance to move but also complicates negotiations for compensation. The lack of consensus on relocation affects the efficiency of these policies.

Last words

SMALL SYSTEMS BIG HEARTS

Fig 17. Friendly locals

Fig 18. Trip on the river

Fig 19. Group picture at Borobudur

Embarking on fieldwork is a world apart from the confines of textbook learning. Picture this: our field trip had us navigating through the community, soaking in insights through observation, questions, and attentive listening. Forget online research papers; we were on the ground, chatting with community leaders, professionals, policymakers, and residents who spilled the real, firsthand details. Sorting through the gathered information, our task is to transcribe and clean the data, sift out the gems, connecting them like puzzle pieces to unveil a comprehensive picture of the local water management system. This hands-on approach not only enhances our understanding but also fosters a profound connection between theory and practice, solidifying the significance of experiential learning in our educational journey.

We are particularly interested in the topic of normalisation and naturalisation and feel that it would be insightful to take a deeper dive into the nuances between normalisation and naturalisation, in comparing which policy is the best for Jarkarta given factors such as the already substantial investment in naturalisation and the presence of residential communities along the river. We would also like to delve into whether a judicious compromise can be reached between the 2 policies, a hybrid of sorts, that would be able to placate the expectations and limitations faced by all stakeholders, bridging the gap in expectations.