

Mitigating hydro-meteorological hazard impacts through improved transboundary river management in the Ciliwung River Basin

RIVER GOVERNANCE AND FLOOD MANAGEMENT ARRANGEMENTS IN INDONESIA

July 2020



About the Project

The project Mitigating Hydrometeorological Hazard Impacts Through Improved Transboundary River Management in the Ciliwung River Basin will examine how the current transboundary river management arrangements in the Ciliwung River Basin, Indonesia influence flood hazard impacts. The interdisciplinary project will bring together expertise in flood modelling, disaster risk reduction, urban planning, public policy, and behavioural science with the objective of identifying the environmental, socio-economic, political and organisational landscape associated with flood risk in the Ciliwung River Basin. The results will be used to inform improved transboundary river management arrangements for the Ciliwung Basin and provide a model for urban and peri-urban river basins elsewhere.

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- Major River Basin Authority for Ciliwung and Cisadane Watershed (BBWS)
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1. Introduction

This work was conducted as part of the project *Mitigating hydrometeorological hazard impacts through improved transboundary river management in the Ciliwung River Basin*. This UK-Indonesia collaborative project, funded by NERC and Ristekdikti, aims to inform plans for improved transboundary river management to tackle flooding in the Ciliwung Basin, Indonesia.

The aim of this document is to examine the existing arrangements for flood and river management in Indonesia, in order to understand the current state of play and any challenges faced. To achieve this, a review of the literature was conducted. The review applied the project's conceptual framework (Clegg *et al.*, 2019). The framework has three pillars - legal/institutional, political and operational - based on that originally proposed by Savenije and van der Zaag (2000). The current review used the framework to understand the existing flood and river management arrangements in Indonesia.

The report is structured as follows: the background context to flooding and governance arrangements in Indonesia is first given, followed by the methods used to conduct the review. The report is then structured by the three conceptual pillars (legal/institutional, political, operational). A summary and discussion are then provided.

1.1. List of acronyms and translations

Throughout this document acronyms are used to refer to the main actors and some of the key aspects of river and flood management in Indonesia. This section provides an overview of acronyms used and their English and Bahasa Indonesia translations.

- BAPPEDA (*Badan Perencanaan Pembangunan Daerah*) – Provincial/district development planning agency
- BAPPENAS (*Badan Perencanaan Pembangunan Nasional*) - National development planning agency
- B(B)WS (*Balai (Besar) Wilayah Sungai*) - River basin authorities
- BKSP (*Badan Kerjasama Pembangunan*) – Jakarta development planning board
- BNPB (*Badan Nasional Penanggulangan Bencana*) - National disaster management agency
- BPBD – Provincial disaster management agency
- Dewan SDA (*Dewan Sumber Daya Air*) – National water council
- Forum PT - Higher education forum for DRR
- Kemen PU PERA (*Kementerian Pekerjaan Umum dan Perumahan Rakyat*) – Ministry of Public Works
- PLANAS-PRB (*Platform Nasional untuk Pengurangan Risiko Bencana*) - National platform for DRR
- RAN-API (*Rencana Aksi Nasional Mitigasi dan Adaptasi Perubahan*) – National Action Plan on Climate Change Adaptation
- RPJM (*Rencana Pembangunan Jangka Menengah*) - Medium term development plan
- RPJP (*Rencana Pembangunan Jangka Panjang*) - Long term development plan

- TKPSDA (*Tim Koordinasi Pengelolaan Sumber Daya Air*) – Basin water resources management council
- WS (*Wilayah Sungai*) – River basin management unit

2. Background Context

2.1. Flooding in Indonesia

Indonesia is heavily impacted by flooding on a frequent basis. Flooding across the country can be of fluvial, pluvial or coastal nature. Recent floods have affected large numbers of people and resulted in great economic losses (Djalante and Garschagen, 2017). Over 5.5 million people were affected by riverine flooding alone between 1990 and 2020. Over 6 billion US Dollars of damages were recorded from these floods over the same time period (CRED, 2020). Major flood events in Indonesia are frequently reported in the capital city Jakarta. For example, significant flooding affected the city during January 2020. The floods resulted in 66 deaths and the displacement of 36,000 people (Leung, 2020). However, various regions across the Indonesian archipelago also experience significant flooding. In recent months, floods have been reported in Sumatra, Kalimantan, Sulawesi, Aceh and other parts of Java (FloodList, 2020).

Indonesia has a monsoon climate. Heavy rainfall and associated flooding are experienced most commonly during the peak wet season (December - February) (Tjasyono *et al.*, 2008). Overtime there has been an increase in intense precipitation during the wet season (Siswanto *et al.*, 2015), along with an increase in the frequency of flood events (Fulazzaky, 2014). An increased chance of extreme rainfall amounts across the Southeast Asian region during the wet season has been projected (with greater than 90% probability) (IPCC, 2013). As such, many regions of Indonesia are expected to experience increased flooding in the future.



Figure 1. Residents are evacuated from a flooded area of Jakarta, 1st January 2020 (SOPA Images Limited/Alamy Stock Photo)

2.2. Governance in Indonesia

Indonesia has a decentralised multi-level governance system which was established after reformation of the government in 1999. The country is divided into 34 provinces (*Provinsi*) see Figure 2, each with an elected governor. Provinces are subdivided into rural regencies (*Kabupaten*) and urban cities (*Kota*). The third sub-division is districts (*Kecamatan*), which are further divided into villages. Along with national government, this forms Indonesia's five tier government system.



Figure 2. Provinces of Indonesia (VectorStock)

There are 133 river basin units across Indonesia, known as *Wilayah Sungai (WS)* (Ministerial Regulation No. 11a/PRT/M/2006). Thirteen of these are located within a single district and 51 are located within a single province. 27 WS cross two or more provinces, and five cross the border with neighbouring countries. The remaining 37 are considered 'national WS' under the national government (Fulazzaky, 2014). The decentralised multi-level governance system, combined with many transboundary basins, means that a great deal of coordination is required for effective flood management.

3. Methods

River governance and flood management arrangements in Indonesia were explored through a literature review. The review included both academic and grey literature sources. The literature was retrieved through online searches using Google, Google Scholar and the University of Huddersfield's online library portal. Key word searches included the following words (and in combination): 'disaster management', 'flood', 'flood risk management' 'governance', 'Indonesia', 'river management', 'water management'. The literature was drawn from the relevant fields of disaster risk reduction (DRR), flood risk management (FRM) and water management. Although water management is a broader topic than flooding alone, it provides important context and insights into how river basins are managed. The literature review was supported by the project's conceptual framework. The framework expands on that for the management of shared river basins, originally proposed by Savenije and van der Zaag (2000). The framework has three pillars, legal/institutional, political and operational. The three pillars are used to structure the remainder of this document.



Figure 3. The project team visiting the Ciliwung River, Jakarta (Credit: the authors).

4. Legal/Institutional

4.1. Legal Frameworks

This section highlights some of the key pieces of legislation relevant to flood and river basin management in Indonesia.

4.1.1. Disaster Management Law

Law 24/2007 (Republic of Indonesia, 2007) is Indonesia's disaster management law. The law provides a legal basis for disaster management and concerns all disasters, including flooding. It promotes a more preventative approach, with comprehensive, multi-sector risk reduction, as opposed to responsive management approaches taken previously (Mardiah *et al.*, 2017). At the national level, DRR is managed by BNPB, the disaster management agency. BNPB is responsible for planning and implementing DRR, and coordinating across the areas of preparedness, response, prevention and recovery. There are further local disaster management agencies located at provincial and district level, known as BPBDs. Associated with the disaster management law is the National Plan on Disaster Management (***Rencana Nasional Penanggulangan Bencana/Renas PB***). Similar provincial and district plans are also prepared (Djalante and Thomalla, 2012; Djalante and Garschagen, 2017; Center for Excellence in Disaster Management and Humanitarian Assistance, 2018).

The law is considered one of the most important pieces of legislation for disaster management in Indonesia (Das and Luthfi, 2017). However, several issues with the law have been identified. One criticism is that the law does not set out roles and responsibilities clearly (BNPB, 2015; Grady *et al.*, 2016). In addition, it has been suggested that the law has a 'policy disconnect' between governance levels, with the national plan not being fully implemented at other levels (Grady *et al.*, 2016). Although local plans are in place, some local governments do not have regulations to implement the plans which has hindered progress in practice (Anantasari *et al.*, 2017).

4.1.2. Water Law

Water related legislation in Indonesia has undergone several changes in recent decades. In 2004, a new water law (7/2004) was introduced replacing the previous law on irrigation (11/1974). However, in 2015 7/2004 was revoked and replaced again with 11/1974. As the irrigation law was outdated in terms of its water resource management principles, the law was expanded upon via several additional regulations (based on law 7/2004) (Asian Development Bank, 2016b; Ariyanti *et al.*, 2020). As of October 2019, a new water resources law (17/2019) has been enacted. The reasons for the changes in water legislation were related to control of water resources. The new law stipulates state control of water resources, and that any non-public use must be licensed (Assegaf *et al.*, 2019).

The following paragraph refers to experiences associated with Water law (7/2004) for an understanding of previous procedures. Water law 7/2004 defined five pillars of Indonesian water resource management. The three main pillars were 1. Water conservation, 2. Water utilisation, 3. Control and mitigation of water hazards. There were two additional supporting pillars 4. Community and private sector involvement and 5. Information systems network (Ariyanti *et al.*, 2020). The law was considered to be broadly in line with the principles of Integrated Water Resource Management (IWRM) (Asian Development Bank, 2016b; Ariyanti *et al.*, 2020). For example, it acknowledged the river basin as the relevant scale of management and assumed the principle of "one basin, one plan, one management" (Asian Development Bank, 2016a). Indonesia is divided into river basin units, WS (***Wilayah Sungai***). A WS is "one or more basins/catchments

under one authority” (Ariyanti *et al.*, 2020). There are 133 WS identified in the presidential decree, and each has an associated river basin authority, a B(B)WS at national level, or Balai PSDA under the provincial government (Ariyanti *et al.*, 2020). For many WS, basin management plans have been prepared. This includes **Pola**, which are strategic framework plans, and more detailed **Rencana** (Asian Development Bank, 2016b). Furthermore, the law also highlights the need for coordination between different stakeholders. For this purpose, a series of water resource management councils were established (see Section 4.2.3 on coordinating institutions).

However, several problems with the water law were identified in a study by the Asian Development Bank (2016a, 2016b). As it was a more generalised framework law, it had associated government regulations that expanded upon it. It has been suggested that the large number of additional regulations overlapped and created a complex picture, which made successful implementation difficult. In general, there has been a great deal of planning for river basin management, however actual implementation has been lacking. For example, **Pola** river basin management plans were not widely applied. The plans were criticised for being overly heavy and of poor quality in some cases, making it difficult to identify and then address the core issues. There was also a lack of clear guidelines for the development of **Pola**, and a lack of clarity on the difference between **Pola** and **Rencana**. As such, there has been less progress on the **Rencana**.

4.1.3. Development and Spatial Planning

Development in Indonesia is led by the development planning process, guided by the national development planning law (25/2004) (Republic of Indonesia, 2004). Development plans are prepared on three timescales, long term development plans (RPJP) (20 years), medium-term development plans (RPJM) (five years) and short-term (one year) plans (Wijaya, 2018). The plans span all government functions and are conducted at national, provincial and local (city/regency) levels. The national development plan is designed to provide a shared vision among stakeholders for ‘coordinated’ and ‘mutually supporting’ actions, as set out in the aim and purpose of the plan (I. 1.3) (Republic of Indonesia). National development planning is led by the national planning agency BAPPENAS. Their role is to establish national development policies, plans and budgets. They also have a cross-sectoral coordinating role (BAPPENAS, 2020).

Development planning is of importance for flood and river management as it sets out the key priorities to be addressed, thus determines how much attention these aspects receive. The current RPJP (2005-2025) (Republic of Indonesia, 2005) makes several references of the need to consider disasters. For example, it acknowledges the need for quality spatial planning to address vulnerability to hazards. The plan notes that current water management lacks coordinated action at both central government level and among the provinces (II.1 D.1). It further states “the control of the destructive effect of water resources places the priority on the non-construction approach through the conservation of water resources and through the integrated regional management of rivers” (IV.D.29), highlighting the need for coordinated river management. The relevant national priority in the RPJP is IV.1.6 ‘realizing Indonesia that is beautiful and conserved’, where the need of mitigating natural hazards and the management of water resources is highlighted. Although the development plans set out important goals, they do not indicate how these goals should be achieved.

The non-spatial development plans are accompanied by spatial land use plans associated with law 26/2007 on spatial planning. Alignment between the two planning processes is important as they impact one another. However, issues have been identified in terms of integrating the spatial and non-spatial plans, as well as linking the plans from national to provincial and local levels (Handayani *et al.*, 2019). In addition, although spatial planning law states the requirement to consider disasters, there is little guidance on how spatial planning and disaster management should be integrated (Das and Luthfi, 2017). The spatial planning law provides some incentives for compliance, for example revoking of permits and fines (Asian Development Bank, 2016b). Despite this, spatial planning laws suffer from low enforcement and compliance (Grady *et al.*, 2016; Hellman *et al.*, 2018), and the spatial plans are not widely applied in the development of other sectoral plans (Mardiah *et al.*, 2017).

4.2. Horizontal and Vertical Coordination

For effective flood and river management, stakeholders must be able to coordinate their actions. This requires coordination between levels of governance (vertical) and between neighbouring jurisdictions (horizontal) in Indonesia's decentralised governance system. This section describes some of the coordination approaches and challenges.

4.2.1. Vertical

Indonesia has a multi-level governance system, divided into five levels from national to village. Power is shared between these levels of governance (Srikadini *et al.*, 2018). The decentralisation of the governance system provided greater powers to local governments and reduced the role of national and provincial levels (Handayani *et al.*, 2019). However, Grady *et al.* (2016) suggests that this created a gap at the provincial level, which has prevented DRR policy from being fully connected. As well as in DRR, vertical coordination issues have been identified for CCA, spatial planning and flood management (Djalante and Thomalla, 2012; Handayani *et al.*, 2019). To provide an example, poor vertical coordination was identified as a reason for the delay in the implementation of Jakarta's Eastern Flood Canal, which was hindered due to poor communication between provincial and district levels (Simanjuntak *et al.*, 2012).

4.2.2. Horizontal

Horizontal coordination is particularly important for the management of river basins that cross multiple jurisdictions. The integrated management of rivers at the basin level was set out in Indonesia's 7/2004 water law (see Section 4.1.2). In practice however, there is little river basin level coordination taking place (Sagala *et al.*, 2013). The lack of basin level action has been associated with the decentralised governance system. Indonesian local governments have their own powers, and are able to create their own plans and regulations. Although this has been positive in allowing local governments to address the diverse needs of local areas, it has led to fragmented approaches to development between areas (Firman, 2014), and has posed a particular challenge for river management (Dewi and van Ast, 2017; Rahayu *et al.*, 2019). In their discussion of Jakarta floods, Sagala *et al.* (2013) suggest that elected officials know there is a need for coordination with neighbouring provinces, however, it has not taken place as it is not known who should take responsibility for the process. Similar issues coordinating between neighbouring areas on DRR has been noted (Mardiah *et al.*, 2017). In addition, it has been identified that existing coordination requirements in place are not detailed or sufficient enough (Firman, 2014; Mardiah *et al.*, 2017). For example, Firman (2014) identifies the inter-local-government partnership regulation as being too simplistic to address the complexity of coordination.

4.2.3. Coordinating institutions

Specialised institutions exist to facilitate stakeholder coordination. PLANAS-PRB is the national platform for DRR. The platform brings together different stakeholders, including ministries and agencies, civil society organisations, NGOs, private sector organisations and universities (Djalante and Thomalla, 2012; BNPB, 2015; Grady *et al.*, 2016). The platform has been identified as beneficial for integrating the views and interests of different stakeholders (Mardiah *et al.*, 2017). However, the platform has faced some challenges. PLANAS-PRB is mostly engaged in policy evaluation, and not development, which limits the scope of their influence (Srikadini *et al.*, 2018). The platform has also been identified to suffer from funding and resource issues (Djalante, 2012; Grady *et al.*, 2016). There are further DRR coordination platforms, including the Consortium for Disaster Education (CDE) that coordinates DRR education, and the UNTWG-DRR, for coordination of UN actors for DRR in Indonesia. The different forums themselves have been noted to have good levels of interaction between them (Djalante, 2012).

Coordinating institutions also exist for water management. At the national level there is the national water council (DSDA) which is composed of government and non-government actors (DSDA, 2020). For each WS a basin water resource authority has been established, known as BBWS (under national government) or Balai PSDA (under the provincial government). These organisations have mandates for water resource management. Further coordinating institutions were established at basin level, known as TKPSDA. These act as multi-sector, multi-actor councils for water management. The national and provincial water councils are mandatory (under 7/2004), however the basin councils are not. As of 2016, there were only 34 TKPSDA in place. In addition, it has been identified that BBWS under the central government have greater capacity in terms of resources than their provincial counterparts because of the support the central government provides (Asian Development Bank, 2016b).

4.3. Participation

Several of the legislative acts noted in Section 4.1 make reference to participation of the public, including the disaster management law (Das and Luthfi, 2017) and the water law (Asian Development Bank, 2016b). However, in most cases, this has not led to the implementation of participation widely.



Figure 4. A volunteer helps to evacuate residents in a flooded area of Jakarta, January 2020 (Xinhua/Alamy Stock Photo)

Law 24/2007 on disaster management states that the public have the right to participate in disaster management decision making (Anantasari *et al.*, 2017). Das and Luthfi (2017) note that despite this reference to participation, the law does not provide any specific guidelines on how it should be implemented. They also identify that the rationale for participation is not always to increase fairness and effectiveness, but for cost reasons. A similar situation was seen with water law 7/2004. Although the law made reference to public participation, it did not foster extensive participation in practice. Reasons cited for this were a lack of knowledge of communities and a lack of opportunities to participate presented by the water management authorities (Asian Development Bank, 2016a). Furthermore, participation if

often more short term, as practitioners are limited by their funding, meaning that engagement does not continue once projects have ended (Lassa *et al.*, 2018). The lack of participation in water management is acknowledged in the RPJP (2005-2025), which states "...the awareness and participation of the general public, as one of the prerequisites for ensuring the sustainability of a water management pattern, have not yet reached the desired level because of their still limited opportunity and capacity" (Republic of Indonesia). In general, Indonesia's approach has been predominantly top-down, which means there has been relatively little opportunity for community participation (Garschagen *et al.*, 2018; Hellman *et al.*, 2018). However, in the absence of government-led initiatives, the community have been active in river management in a more bottom-up form. For example, community groups are engaged in activities such as river maintenance and waste clearing (Padawangi and Douglass, 2015; Tampi *et al.*, 2017). Further information on community participation, specifically related to flood early warning in the Ciliwung Basin can be found in the participation in early warning project report (Clegg *et al.*, 2020).

5. Political

5.1. Political Will

The prevalence of coordinating institutions for DRR and water management in Indonesia suggests there is political will for coordination of efforts. Djalante *et al.* (2013) suggest that the need for integration across sectors, such as between DRR, CCA and development is acknowledged by officials at the national level. However, the same political will is not seen at sub-national levels. As local governments have their own powers, they are able to decide on their own priorities, and also the degree to which they are willing to cooperate with neighbouring areas. Firman (2014) describes local governments as 'inward looking', in that they are focused on their own priorities and are not interested in working with others.

5.2. Capacity

The decentralised governance system has given responsibility for implementing DRR to sub-national levels. However, capacity issues have been noted, particularly at the municipal and district level, which has hindered practical implementation. In terms of DRR, it has been identified that local disaster management agencies (BPBDs) face significant resource constraints. They experience high staff turnover and often lack experienced staff. This has been associated with the view that BPBD is unpopular, and is known to be under-resourced, therefore does not attract skilled staff to the roles (Grady *et al.*, 2016; Mardiah *et al.*, 2017; Srikadini *et al.*, 2018). For FRM, it has been identified that there is a lack of capacity to conduct required analyses for the assessment of suitable flood measures. For example, local governments do not always have the capability to carry out risk assessments or to use them in planning (Anantasari *et al.*, 2017). This means that plans sometimes do not fully address the problem (Fulazzaky, 2014). Financial constraints have also been identified. For example, Handayani *et al.* (2019) note that in some cases, the budget allocated for a ministry/agency does not match the level of responsibility that they have for implementing a programme. This limits the capacity of these agencies to meet their responsibilities.

External sources of support have been significant drivers of progress in some cases, in that they have helped to provide financing and skills (see Section 6.2 for an example of how the ACCCRN has supported CCA). This has led to some sub-national governments demonstrating greater success than others (Djalante and Thomalla, 2012). Differences in capacity of jurisdictions has also been related to the process of decentralisation, and quality of local leadership (Firman, 2014; Grady *et al.*, 2016). This can result in capacity disparities across jurisdictional borders which can present coordination issues (Djalante *et al.*, 2013).

5.3. Sectoral Integration

Flood and river management cut across different sectors. The Asian Development Bank (2016a) identify 14 different ministries with responsibilities for water management at the national level in Indonesia. However, a lack of coordination between these actors has been noted. This is exemplified by the IWRM approach taken. The three main pillars for IWRM in Indonesia are: 1. Water conservation, 2. Water utilisation, 3. Water hazards. At national level, each of the three main pillars is led by a different ministry or agency. Water conservation is led by the Ministry of Forestry and Environment, water utilisation by Ministry of Public Works, and water hazards by BNPB (Ariyanti *et al.*, 2020). A similar picture can be seen in disaster management. Handayani *et al.* (2019) identify various relevant agencies including the planning board, public works, BNPB and the environment agency.

The split of responsibilities across different ministries and agencies has led to coordination issues within sectors. This leads to further issues in cross-sector collaboration. It has been noted that for flood management, responsible agencies for DRR, CCA and urban development work to different frameworks and lack regular coordination. In addition, the responsibilities of different sectors overlap, particularly in terms of flood management. Tension between sectors have been noted, due to each trying to establish themselves as the lead in overlapping areas which is not conducive to cooperation (Datta *et al.*, 2011; Srikadini *et al.*, 2018). Some cases of positive coordination have been noted. Anantasari *et al.* (2017) identify that there is good coordination between sectoral agencies at the local government level. For example, they show that BPBD, regional public works (PU) and regional development planning agency (BAPPEDA) coordinate, however this is mostly during emergency response and not on a regular basis. Wijaya *et al.* (2017) discusses the challenges faced in integrating CCA, DRR and spatial planning sectors. They identify that there is no guideline for integration and a lack of institutional capacity, particularly at city/regency level. Integration is also hindered by data availability, quality and access issues, as well as the data handling skills of local officers in some districts.

6. Operational

6.1. Information sharing

For the purposes of information and data sharing at national level, BNPB hosts DIBI, a disaster and data collation platform. The system is used to support decision making, for example it has been used to create a disaster-prone area index for decision making purposes. DIBI have also been established at the provincial level (BNPB, 2015). Another initiative for data and information sharing is Forum PT. The aim of the forum is to increase information sharing and the exchange of experience between tertiary and research institutions. Forum PT is also part of the national platform PLANAS-PRB, thus are able to share their research and expertise with other DRR stakeholders (BNPB and UNDP).

Despite these efforts to share data and information, there are issues surrounding data availability and data handling capacity in some instances. A lack of data access and availability have been noted to pose a barrier to successful consideration of disasters in spatial plans. For example, there is a lack of suitable hazard maps for cities and regencies (Wijaya *et al.*, 2017). Some local governments have limited capacity and have struggled to conduct data tasks, such as multi-hazard risk assessments. As of the DRR baseline status report in 2015, 33 or the 34 provinces had conducted multi-hazard risk assessments, but only 20% of districts and cities had done so (BNPB, 2015). Limited data handling skills of staff at city and regency level has also presented barriers to information being used effectively (Sunarharum *et al.*, 2014; Wijaya *et al.*, 2017). For example, data for the DIBI is collected by districts and then shared with provincial/ national levels to be incorporated into higher level DIBI (Wibowo, 2019). However, there have been difficulties obtaining data from some of the districts (BNPB, 2015).

In terms of early warning, the Ministry of Public Works and Public Housing (PUPR) has responsibility for flood early warning implementation. BMKG and BNPB are also involved in the early warning process. However, there are challenges in information coordination and exchange between these ministries (BNPB, 2015) (p33).

6.2. Climate change adaptation

Indonesia has in place at the national level a National Action Plan for Climate Change Adaptation (RAN-API) (BAPPENAS, 2012). Although RAN-API is considered to provide a good basis for CCA in Indonesia, implementation of the plan has been hindered. This is due to a lack of coordination between stakeholders during the development of the plan, and during its implementation (Djalante and Thomalla, 2012; Rahman, 2017; Climate Scorecard, 2018). Furthermore, the RAN-API is not legally binding, therefore there is no incentive for ministries and local governments to take it into account in their work. There is also no lead ministry to ensure that the plan is being implemented (Rahman, 2017; Lassa, 2019). As discussed in Section 5.2, capacity issues within local governments have also impacted their ability to fully realise all their responsibilities on CCA (Nugraha and Lassa, 2018). Furthermore, CCA has been noted to be not well integrated into other sectors, e.g. spatial planning or DRR (Mardiah *et al.*, 2017; Wijaya *et al.*, 2017).

In some cases, cities have received external support for developing more local level CCA strategies. For example, Semarang City developed a City Resilience Strategy with the support of the Asian Cities Climate Change Resilience Network (ACCCRN) (Lassa, 2019). Another Indonesian city, Bandar Lampung, has also been part of the ACCCRN (Nugraha and Lassa, 2018). These cities have provided a test bed for adaptation strategies. Nugraha and Lassa (2018) discuss how CCA has been established in Bandar Lampung under the ACCCRN. In Bandar Lampung a City Team was established as part of the project.

The City Team was a multi-stakeholder group composed of representatives from universities, NGOs and officials from BAPPEDA and BPBD, among others. The City Team provided a platform for interaction between the different stakeholders. Over time, the City Team established itself and developed its role to provide greater facilitation of adaptation projects. Additional leadership from the city mayor, who was involved in the City Team, further supported the initiative. The City Team was noted to have provided good stakeholder coordination, knowledge integration, and to have built trust between different actors. The Team was also able to coordinate vertically with provincial and national governments. However, it still faced challenges, such as a limited city budget, a lack of climate change regulations at the provincial level, as well as a lack of action in neighbouring areas.

7. River Management and Flood Governance in Jakarta

Jakarta, the capital city of Indonesia, is heavily impacted by frequent flooding. The causes of flooding in Jakarta are a complex mix of bio-physical, socio-political and governance related challenges (Goh, 2019). In terms of the governance structure, DKI Jakarta is a province with special status, led by a governor (Sunarharum *et al.*, 2014). There are five municipalities within the province (South, East, Central West and North) (see Figure 5), each with a mayor (Simanjuntak *et al.*, 2012). As a city with provincial status, Jakarta has greater decentralised power than other cities. This section provides an overview of some of the flood and river governance arrangements and challenges specific to Jakarta.

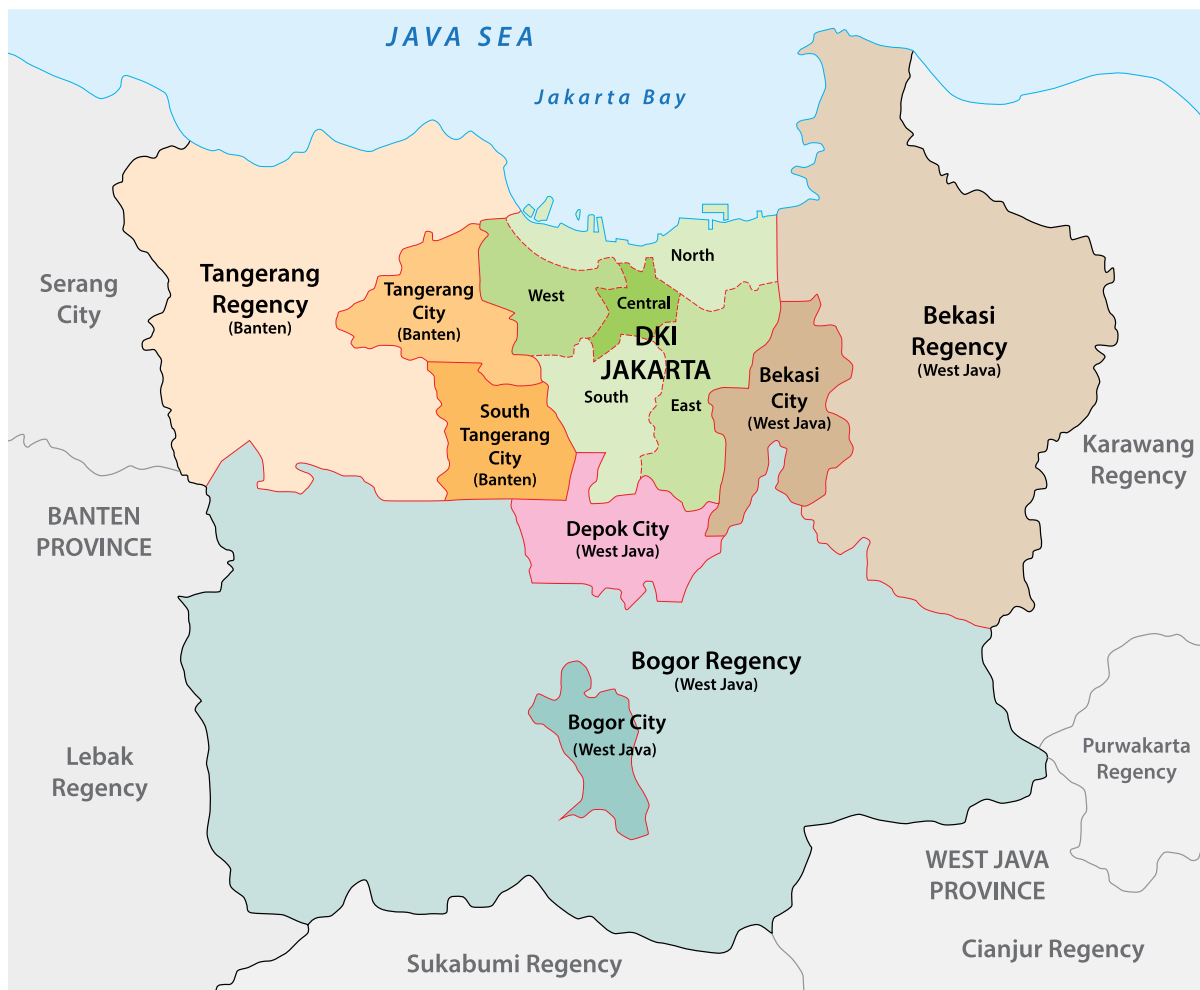


Figure 5. Municipalities in the Greater Jakarta area (VectorStock)

Jakarta has its own development coordination board, known as BKSP. The role of BKSP is to plan, coordinate, and monitor urban development in the region (Ward *et al.*, 2013). However, it has been suggested that BKSP has limited authority and power, so cannot influence decision making or ensure implementation (Sagala *et al.*, 2013; Firman, 2014). Similarly, several other institutions in Jakarta have coordination roles for flood and river management. This includes DSDA, the BBWS and TKPSDA. However, it has been reported that they have a lack authority to enforce (Dewi and van Ast, 2017). A lack of coordination between stakeholders was identified as one of the key barriers to achieving a flood resilient community in Jakarta, and it is suggested that addressing this problem will be key for flood resilience in the city (Dwirahmadi *et al.*, 2019). Problems in coordinating flood management between different actors in Jakarta has been linked

to several issues including lack of clarity about roles and responsibilities, financial constraints, and a lack of structured coordination (Dewi and van Ast, 2017). A lack of coordination with neighbouring areas is also noted. This is not linked to the need not being recognised, but to a lack of clarity on who should lead the process (Sagala *et al.*, 2013). The leadership and political will provided by Jakarta governors has been noted to have impacted how much action on flooding has been taken in the city (Sagala *et al.*, 2018). Conflicts of interest have also posed barriers to flood management. For example, this has been a feature of debates on the proposed giant sea wall project (Garschagen *et al.*, 2018).

Jakarta has its own spatial plan and detailed spatial plan that set out development aims for each of Jakarta's districts. The spatial plan includes an assessment of the areas of the city at risk from flooding. The plan includes strategies primarily targeted at increasing the drainage capacity of the city. Therefore, approaches are largely structural in nature (Drestalita and Saputra, 2019).

Jakarta also has some of its own information sharing systems in place. For example, DIMS (disaster information management system), operated by BPBD, allows the agency to share information with other disaster management agencies for timely decision making. Another flood information sharing platform is PetaBencana. The online platform allows updated information on flooding in parts of Java. It allows the public to submit reports, crowdsourcing up-to-date information (Center for Excellence in Disaster Management and Humanitarian Assistance, 2018).



Figure 6. Large parts of Jakarta city were flooded during the severe 2002 event (REUTERS/Alamy Stock Photo)

8. Summary and Discussion

The aim of this document was to review the current arrangements for flood and river management in Indonesia. It sought to understand the current arrangements, and discuss the key challenges faced.

Indonesia has a national legal framework for flood and river management through the disaster and water management laws. A great deal of emphasis has been placed on disaster management since the introduction of the law in 2007. Progress has also been made in water management, with the water law being based on IWRM principles, which is key for coordinated basin-wide management (Varis *et al.*, 2014). There are also specialised institutions dedicated to planning and management in both of these fields. Planning for disaster and water management is an area where significant progress has been made. Various planning processes are conducted across the different levels of governance. The long term RPJP provides an overarching framework, and the inclusion of disasters and water resource management in this plan suggests an acknowledgement of the need to address these issues. The abundance of multi-stakeholder platforms and forums for various sectors would also suggest acknowledgement of the need to coordinate.

On paper, Indonesia would appear to have a strong legal, institutional and planning basis for disaster/flood and river management. However, recurrent problems are highlighted throughout this review that prevent the plans from being implemented effectively. One significant issue is coordinating the work of the many different institutions, both vertically and horizontally. River and flood management are inherently cross-cutting in nature; however, cross-sector collaboration appears particularly challenging within Indonesia's complex multi-level governance system. This is in addition to the split of sectoral responsibilities across different agencies. While mechanisms for coordination between DRR actors (e.g. PLANAS-PRB) and water resource management actors (e.g. water councils) exist, there would appear to be less opportunities for cross sector collaboration. For example, from this review it is difficult to discern what collaboration takes place between water management and disaster management authorities. While there would appear to have been a great deal of emphasis placed on the integration of disaster management with other related aspects, such as CCA and development and spatial planning in the literature, there is little literature available on the links between DRR and water management. Both are of importance from a transboundary river and flood management perspective.

Another recurring issue is the translation of plans into practical implementation. This can be linked to a series of challenges. Although national documents state the need to coordinated action on water management and disaster management, the guidance provided on how this should take place is limited. This makes it unclear how practical implementation should be approached. Capacity issues would also appear to be a challenge, relating to financial and human resource aspects, particularly at the sub-national levels who are responsible for implementation. Political will and leadership at the sub-national levels would also appear to be less conducive for coordinated action. It will be of importance for Indonesia to tackle coordination and capacity challenges for transboundary flood management issues to be managed effectively.

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