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INSTITUTIONAL REFORM FOR WATER CONFLICT RESOLUTION IN MALAYSIA: A PRELIMINARY STUDY OF PENANG STATE AND KEDAH STATE

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ABSTRACT

Since industrial revolution in seventeenth century, water resource has been considered as a vital resource for economic growth. However, due to climate change, availability of water resource has become very uncertain. This has led to conflict between water users from different countries, cities and sectors on water resource allocation. In Malaysia, Kedah State and Penang State are two of five water stressed State in the country. Due to economic development, rapid urbanization and climate change, conflict in between both States over water resource allocation has been an unresolved issue that threatens social and economic sustainability in recent years. Therefore, this paper aims to review current institutional framework and of water resource management in Malaysia to explore the actors and factors that can contribute to resolve conflict of water allocation in between Kedah State and Penang State. Primary and secondary information were adopted from the analysis. Particularly the country's, Kedah State's and Penang State's water legislations are deeply reviewed. Results reveal that from governance perspective, water resource governance in Malaysia is the responsibility of different government agencies. In addition, there is currently lack of corporation among stakeholders in managing water catchment areas that are shared by both States. Findings of this study will contribute to transform water governance in developing country towards a more sustainable water system.

Keywords: *Conflict resolution, water resource management, institutional framework, water policy*

1 INTRODUCTION

Water is considered as a vital resource for global sustainability and economic growth. Nevertheless, due to factors such as global climate change, rapid urbanization, and environmental degradation, water resource is depleted at a faster rate in twenty-first century. If this trend continues, 45% and 40% of global Gross Domestic Product (GDP) and global grain production will be threatened by the issue of water shortage and causing more conflicts among water users (WWAP, 2019). When clean water is limited, competition for available resource can lead to conflict among countries, cities, commercial users and domestic users. Particularly, water conflict is more likely to happen in places that are still lack of a comprehensive water management system (Gleick, 1993). Therefore, countries are called to transform their institutional and legal frameworks to resolve existing and potential water conflicts (Kreamer, 2012).

Malaysia is a tropical country that is located in the region of Southeast Asia, it is considered a country that is rich in water resource. Physically, Malaysia is blessed with 3,000 millimeter (mm) of annual rainfall (Abdullah, 2002). There are 189 river basins system across the country and renewable freshwater resource is around 19,187 cubic meter (m^3) per capita per year, which is much higher than the global average at 5,921 m^3 per capita per year (World Bank, 2018). However, the country is still exposed to water supply issues. According to the National Water Resources Study (2011), water resource availability and distribution are varies across States (Figure 1). Out of 13 States in Malaysia, there are States like Pahang, Perak, Kelantan, Terengganu, Sabah and Sarawak rich in water resource where the States' water availability is more than its water demand. In contrast, there are also States like Perlis, Kedah, Penang, Selangor and Melaka facing the problem water deficit. Five of these states are vulnerable to the risk of water shortage, especially when the country is hit by drought.

In Malaysia, both Federal Government and State Government play a vital role in water resource governance. Generally, water resource governance in Malaysia is largely based on top-down government-centered machinery (Chan, 2012). Non-government stakeholders like public, non-governmental organizations, and business are not the primary stakeholders when comes to water resource governance (Lai et al., 2017). At the federal level, water governance is the responsibility of several federal ministries and departments. At the state level, water resource governance is the responsibility of respective State Governments. Studies have claimed the current institutional framework of water governance in Malaysia is fragmented and lack of integration across sectors (ASM, 2016; Chan, 2009; Khalid et al., 2012; Mokhtar et al., 2011). Since the country independent in 1957, the Federal Government has made several institutional reforms in water sector. The most

recent reform was in 2006, when initiatives taken by the Federal Government to improve efficiency of water supply sector by taking over State's responsibility in water supply regulation (Ching, 2012). This paper aims to review recent conflicts among water stakeholders and recent progress of institutional development of water resource governance in Malaysia. Challenges of current institutional framework in resolving water conflicts are discussed.

2 METHODOLOGY AND STUDY AREA

2.1 Study Area

This paper focuses in discussing water resource governance in Penang State and Kedah State. Both States are located in the Northern part of Peninsular Malaysia (West Malaysia). Penang State is among the smallest States in Malaysia with an area of 1,032 km^2. It is populated by 1.72 million of people and Penang State's tap water consumption per day is 827 MLD (million liter per day). For Kedah State, it has a total area of 9,500 km^2. Kedah State's population is estimated at 2.12 million, and total tap water consumption per day is 725 MLD (DOSM, 2018; MWA, 2018). Both Penang and Kedah are two of the five water stressed State in Malaysia that facing the problem of water deficit (NWRS, 2011). Geographically, both States are the neighboring state to each other. Penang State and Kedah State are chosen for this study because there are shared water catchment areas between them, and they have a history of water conflict.

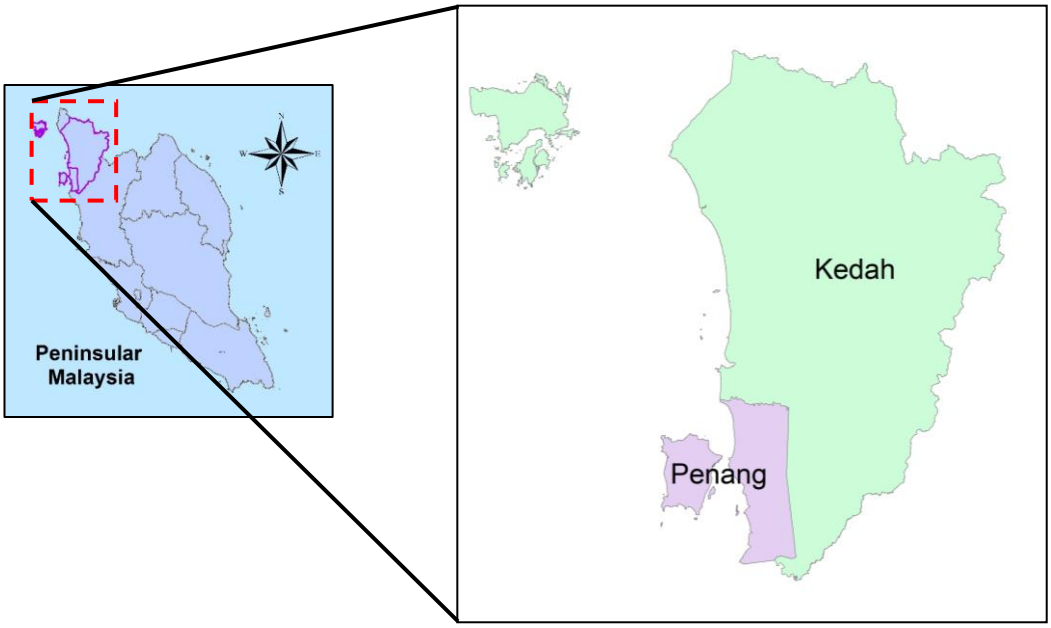


Figure 1. Location of Penang State and Kedah State, Malaysia

2.2 Methodology

This review article is largely based on secondary data. Legal documents such as Penang Water Supply Enactment 1998 and Kedah Water Resources Enactment 2008 were studied to investigate the institutional framework for water resource governance in Penang and Kedah. In addition, previous research reports, government reports, reports published by water service providers and news articles were also referred. Besides, several informal discussions were conducted with government officers who serve in water-related departments to acquire their views on institutional challenges of water resource governance in Malaysia.

3 RESULTS AND DISCUSSION

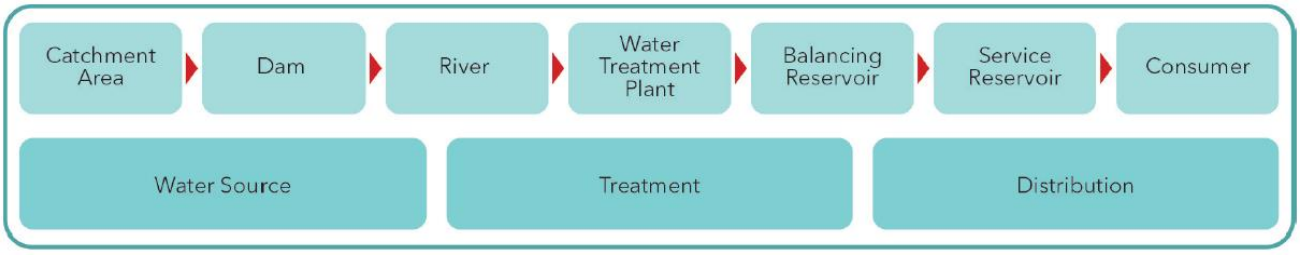
This section presents the findings of this study and discussion of it. At first, the paper discusses the key stakeholders involved in water resource governance. Secondly, the paper gives an overview of the water conflict between Penang State and Kedah State in the past 3 years (2016 – 2018). Thirdly, institutional challenges of resolving water resource conflict in Malaysia are discussed.

3.1 Key Stakeholders of Water Resource Governance in Penang State and Kedah State, Malaysia

Since 2006, water governance in Malaysia is divided to water supply governance and water resource governance (Figure 2). With the enactment of Water Service Industry Act (WSIA) 2006, water supply sector in Malaysia is regulated by the National Water Service Commission (NWSC) since 2006, which is a regulatory body under the Malaysian Ministry of Water, Land and Natural Resources, whereas water resource is regulated by respective State Government under respective state's water resource enactment (Teo, 2014). In Penang State, Penang Water Supply Cooperation (PWSC) is a public listed company that is owned by the Penang State

Government to provide water supply service in Penang (Maidinsa, 2011); whereas Kedah State's water supply service is provided by the Syarikat Air Darul Aman (SADA, known as Darul Aman Water Company if translated to English), a water supply company that is owned by the Kedah State Government (SADA, 2018). Both PWSC and SADA are water service providers that licensed by the National Water Service Commission (NWSC, 2017).

a) Water governance in Malaysia before 2006



b) Water governance in Malaysia after 2006

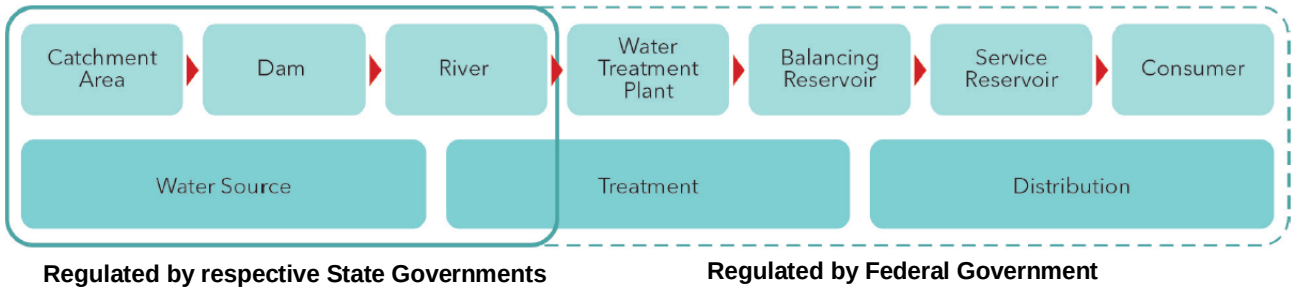


Figure 2. Water governance in Malaysia before and after 2006 (ASM, 2016; NWRS, 2011).

For water resource governance, every State in Malaysia has its own water enactments. Penang Water Supply Enactment 1998 and Water Act 1920 are applied to the Penang State. In Kedah State, Kedah Water Resources Enactment 2008 is enacted to regulate the State's water resource. Because of this, regulation, performance indicator, and governance structure of water resource can be different between two different State (ASM, 2017; NWRS, 2011). In Penang State, water resource regulator is the Water Regulatory Section, a section placed under the Penang State Secretary Office (Penang State Government, 2019). In Kedah State, water resource regulatory is the Kedah Water Resource Board (KWRB) – a State Government's statutory body that is chaired by the Chief Minister of Kedah State and led by a Director (LSANK, 2018). In addition, the Federal Government has the Environmental Quality Act (EQA)1974 that is made to control pollution of water resource quality. The EQA 1974 is enforced by the Malaysian Department of Environment (DOE). Besides, as stated in the Ministers of the Federal Government (No.2) Order 2013, the Department of Irrigation and Drainage (DID) is responsible for the development planning and management of river basin and national water resource. Furthermore, as there are forests gazette as water catchment forest under the National Forestry Act 1984, State Forestry Departments are also involved in managing the water catchment forests.

Table 1. Comparison of water resource management's institutional framework between Penang State and Kedah State, 2016

ITEM	PENANG	KEDAH
AREA (KM^2)	1,032	9,500
POPULATION (MILLION)	1.72	2.12
TOTAL CATCHMENT AREA OF MAIN RIVER BASINS (KM^2)	816.6	7645.3
TOTAL TAP WATER CONSUMPTION (MILLION LITRE/ DAY)	827	725
DOMESTIC TAP WATER CONSUMPTION (LITRE/CAPITA/DAY)	290	223
WATER SUPPLY REGULATOR	National Water Service Commission (NWSC)	
WATER SUPPLY COMPANY	Penang Water Supply Cooperation	Syarikat Air Darul Aman
ADMINISTRATION OF WATER POLLUTION CONTROL	Department of Environment	
PLANNING AND MANAGEMENT OF RIVER BASINS AND NATIONAL WATER RESOURCE	Department of Irrigation and Drainage	
MANAGEMENT OF WATER CATCHMENT AREAS IN FOREST RESERVED AREAS	Penang State Forestry Department	Kedah State Forestry Department
WATER RESOURCE MANAGEMENT AUTHORITY (WRMA)	Water Regulatory Section Of Penang State Secretary Office	Kedah State Water Resource Board

Source: Department of Statistic, Malaysia (2018), Kedah Water Resource Board (2018), Malaysia Water Industry Guide 2017 (MWA, 2018), National Water Resources Study (2011), Penang State Government's website (2019)

3.2 Conflicts of Stakeholders in Water Resource Governance, Penang State and Kedah State

There are four inter-state river basins under the jurisdiction of both Penang State and Kedah State, namely Muda River, Perai River, Jawi River and Kerian River (Kerian River Basin is also shared with Perak State). In the past years, water conflicts in between Penang and Kedah were mostly due to water resource allocation and extraction from the Muda River Basin, which is the second biggest river basins in the northern region of Peninsular Malaysia. The catchment area of Muda River Basin is about 4,150.4 km^2. Upstream and midstream of this basin located in the State of Kedah, whereas downstream forms an interstate boundary between Kedah and Penang. More than 90 % and 80 % of raw water supplied to Kedah State and Penang State are extracted from this river basin (NWRS, 2011). Water conflicts between Kedah State and Penang State started in 2002 when the Kedah State Government proposed logging in the Ulu Muda Forest, this forest is located in the water catchment area of Muda River Basin (Mei et al., 2017).

Table 2 presents the press statements by PWSC over the protection of Muda River Basin. According to the preliminary findings, key stakeholders involved in the conflicts were the heads of Penang State Government and Kedah State Government, Penang Water Supply Corporation, Kedah State Forestry Department, and non-government organizations (NGOs). One of the most controversial topics is the protection of forest reserve area in the Muda River Basin in that located in Kedah State. The Kedah State Forestry Department claimed that logging in the forest reserve area did not cause any environmental impact in Muda River Basin. On the other hand, Penang State Government and Penang Water Supply Corporation (PWSC) claimed that the logging will threaten 4.09 million of people in the norther region of Peninsular Malaysia to suffer from water crisis. Another dispute was about the compensation to conserve forest reserve in Muda River Basin. Most of the water catchment of Muda River located in the upstream and midstream, which is within the border of Kedah State. Kedah State Government feels that they should be compensated for conserving and managing the water catchment areas that provide water resource to Penang and Kedah. Nevertheless, the Penang State Government and PWSC think that the Federal Government should compensate the Kedah State Government, instead of the State Government and water users of Penang.

Table 2. Media releases related to water conflicts between Penang State and Kedah State, 2016 - 2018

Press statement	Date
Ulu muda: protect a regional water catchment area in a sustainable manner	23 October 2018
Ulu muda: thank you for the logging ban but please provide proper legal protection	6 September 2018
Logging in ulu muda is not a forestry issue, it is a socioeconomic threat	23 June 2018
"Save ulu muda" theme for world water day 2018 event in penang on 23/6/2018.	19 June 2018
Please show evidence that "logging did not cause any environmental impact" in ulu muda	7 February 2018
Logging in the ulu muda forest reserve must be stopped, immediately and totally.	24 January 2018
Has the muda dam's water catchment area been reduced by 87.3%?	26 October 2017
Sungai muda: no basis for kedah to claim raw water charges from penang	12 August 2017
Ulu muda: kedah should clarify the truth about logging	9 May 2017
Stop "gambling" with water supply for the 3 northern states	23 April 2017
Gazette ulu muda and solve the problem	14 March 2017
Protect ulu muda before it is too late	8 March 2017
Focus on regional raw water security and sustainability	26 August 2016
Manage raw water resources in the northern region on a regional basis	3 June 2016
Seek federal compensation after ulu muda catchments are gazetted	24 May 2016
Firstly, gazette the water catchments in ulu muda	19 May 2016
Stop the logging in ulu muda now	16 May 2016
Pbapp has never released any raw water into sungai muda or the sea	9 May 2016
Federal Governent adopts Penang's Proposals to avoid water crisis	5 May 2016
Prevent a water crisis that threatens more than 4 million people in 4 States	23 April 2016
How many days can the muda dam and the beris dam last?	18 April 2016
Act now to prevent water shortage in the northern region	15 April 2016
Nothing wrong with sungai muda water scheme barrage	7 April 2016

Source: PBA (2019)

In 2016, when Malaysia was hit by the Super El Niño weather phenomenon, couple of the States were forced to implement water rationing to sustain their water supply (MMD, 2017). During this period, there were more arguments between water stakeholders from Penang State and Kedah State. Particularly, about the right of water resource extraction and the actions should be taken to manage water resource in the Muda River. For instance, Penang State had stopped extracting water resource from Muda River for irrigation activities since the first quarter of 2016. Whereas Kedah State did not stop using water resource from Muda River for irrigation activity. This dispute was finally resolved after the Federal Government hold a meeting with stakeholder from

the Northern Region of Peninsular Malaysia to discuss the strategies for preventing water supply shortage. In summary, conflicts between both States are mostly related to the right of water resource extraction, charge of extracting and conserving water resource, planning for the protection of Muda River Basin.

3.3 Institutional Challenges for Water Conflict Resolution in Malaysia

Figure 3 presents the current institutional framework of water resource management in Muda River. As shown in Figure 3, downstream of Muda River is managed by governmental stakeholders from Kedah and Penang State. In Malaysia, water resource is owned by respective State, and the State Government holds the main responsibility to regulate it. Respective State Government can have laws, regulations, guideline and performance indicators for managing water resource that falls under its jurisdiction. When there is an inter-state river basin owned by two or more States, there can be different laws, regulations, performance indicators and institutional arrangements for managing the inter-state river basin. According to the case study, there is lack of coordination in between both States over the management of Muda River Basin.

The conflict between stakeholders from Penang State and Kedah State over water resource extraction during drought season indicates that there is lack of management plan that is jointly prepared by stakeholders from both States. At federal level, the National Water Council (NWC, formally known as National Water Resources Council) has been formed since 1998. The council is chaired by the Prime Minister and council members consists of relevant Federal Ministers and heads of State Governments. The council is formed to facilitate co-ordination and uniformity of decision making on water resource among the states. Nevertheless, the role of NWC has yet to be formalized by legislation (ASM, 2016). However, the role of NWC should be formalized by enacting the National Water Resource Law that was proposed by the National Water Resource Study (2011). The bill is still in the stage of consultation to get feedbacks from relevant stakeholders before it is tabled (Tasnim, 2019). Currently, institutional framework of water resource governance in Malaysia does not provide a formalized platform for stakeholders from both States to discuss about the basin's management plan.

Besides, water resource governance in Malaysia is largely sectoral based. In the case of Muda River, water resource is regulated by the Kedah Water Resource Board and Water Regulatory Section of Penang State Secretary Office. At the same time, the State Governments are also dependent on the Department of Irrigation and Drainage, which is a Federal Department under the Ministry of Water, Land and Natural Resources (known as KATS in Malay Language) to provide technical assistant in river management. In addition, pollution of water is also regulated by the Malaysian Department of Environment (DOE) under the Ministry of Energy, Science, Technology, Environment and Climate Change (MESTECC). Furthermore, there is a dam in the Muda River Basin that is managed by the Muda Agricultural Development Authority (MADA), which is an agency under the Malaysian Ministry of Agriculture and Argo-based Industry. Still, there are other governmental stakeholders such as Forestry Department and Local Authorities also play a role in river management. Such fragmented and sectoral-based water resource governance does not encourage cross-sectoral integration of water resource governance.

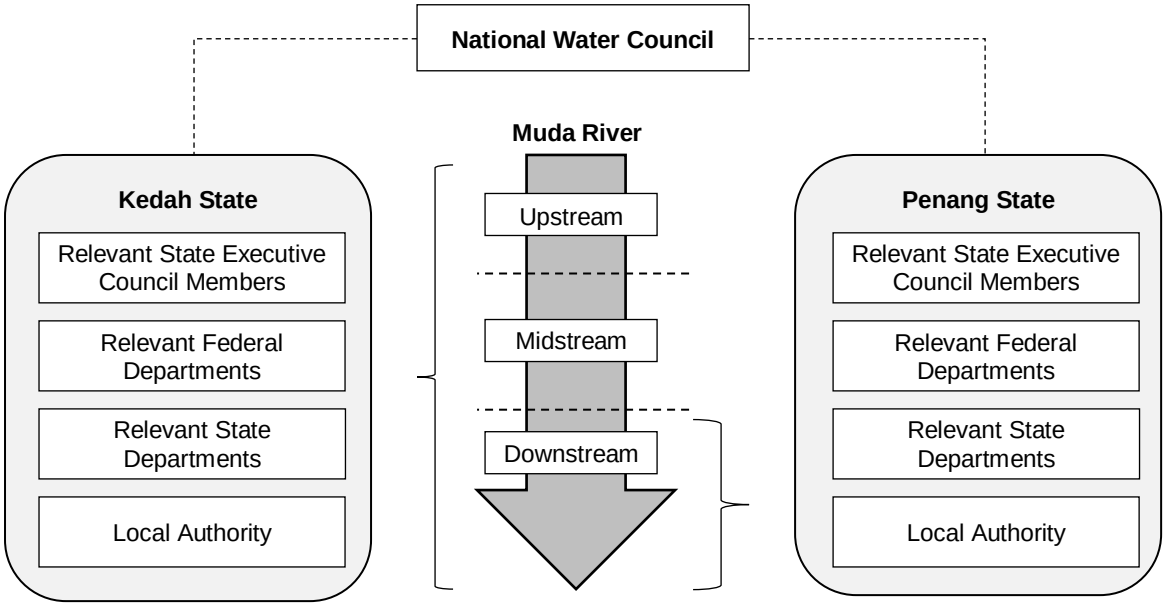


Figure 3. Current institutional framework of water resource governance of Muda River, Penang State and Kedah State

4 CONCLUSION AND THE WAY FORWARD

In conclusion, conflicts between Penang State and Kedah State indicates that current institutional framework of water resource governance in Malaysia is not effective in resolving conflicts among stakeholders. There is no river basin management plan jointly planned and adopted by both State and leading to lack of corporation when both States were hit by prolonged drought in 2016. Besides, there is also lack of formalized communication channels that allow key stakeholders from both State to discuss about water resource management in their shared water catchments areas. Causes of water conflicts between Penang State and Kedah State are mostly about the right of water resource extraction, actions to be taken and financial incentive for conserving their shared water catchment areas, and the usage of forestry resources in the shared water catchment areas. Currently, the responsibility of water resource governance is shared by governmental stakeholders from different federal ministries, state government departments, local governments. Yet, there are also different federal acts and state enactments for regulating water resources in an inter-state river basin.

In the future, more extreme climatic events and rising water demand are expected. There will be rising potential for water conflicts among water stakeholders in Malaysia. Thus, there is a need to reform institutional framework of water governance in Malaysia to promote corporation among stakeholders from different States and sectors. The most recent reform of water sector in Malaysia in 2006 was mainly focused in reforming the water supply sector. For the reform of water resource governance, efforts have been taken but progress remains slow. Particularly, to formalize the role of National Water Council by enacting the National Water Resource Law (NWRL), which was first introduced in 2012. A more detail study needs to be conducted to explore opinions of respective State Government over the proposed NWRL. Besides, there is also a need to have more in-depth research to explore about an institutional framework that can effectively promote corporation among stakeholders over water resource management in an inter-state river basin, especially during dry season.

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