

# Mitigating Hydrometeorological Hazard Impacts through Improved Transboundary River Management in the Ciliwung River Basin

## Flood risk in Jakarta:

In recent decades the Jakarta Metropolitan Area has undergone widespread development and led Indonesia's impressive economic growth. However, the city suffers from undesirable water-resource issues, and experiences frequent flooding. Major floods in 1996, 1999, 2002, 2007, 2013 and 2014 caused billions of dollars of direct and indirect economic damage.

Flood risk in the city is both fluvial and coastal origin, and is driven by a multitude of physical and socio-economic drivers. Physical drivers include land subsidence, poor drainage and storage capacity in Jakarta's rivers and canals as a result of being clogged by waste and sediments eroded from upstream, and climate change. Socio-economic drivers include a rapidly growing population, and land use change causing a growth in economic assets located in flood-prone areas.

Past approaches to flood management have focused on structural prevention measures. However, to address the rising flood risk successfully, it is acknowledged that a more holistic and integrated approach is required, where a diverse range of methods are applied and coordinated throughout the basin, and where social and institutional aspects are accounted for. To achieve this, a strong governance system is required.

## Aim of the project:

The project aims to inform plans for improved transboundary river management in order to mitigate flood hazard impacts in the Ciliwung River Basin.

## The transboundary river management problem:

Despite wide recognition that for successful flood management river basins should be managed as a whole, basin-wide coordination of efforts can be difficult to achieve when a river transcends administrative boundaries.

The Ciliwung River Basin (CRB), with an area encompassing 347km<sup>2</sup>, originates upstream at Tugu Pancak, and runs through the capital city into Jakarta Bay. The River crosses through two provinces (West Java and DKI Jakarta) and four municipalities (Bogor Regency, Bogor City, Depok City and Jakarta City). The decentralised governance system in Indonesia means that each local government has the power to enact regulations, develop its own plans and programmes, and decide on their own priorities based on local interests. Decentralisation has also led to more institutions at different government levels, including those responsible for flood management. Contrasting ways of working, conflicts of interest and differing perspectives can all impact on the ability to coordinate and collaborate across these jurisdictional and institutional borders. In many cases, the sheer level of cooperation needed exceeds the capacity of existing management arrangements and traditional procedures. More effective transboundary governance arrangements are required.

## Transboundary river management practices

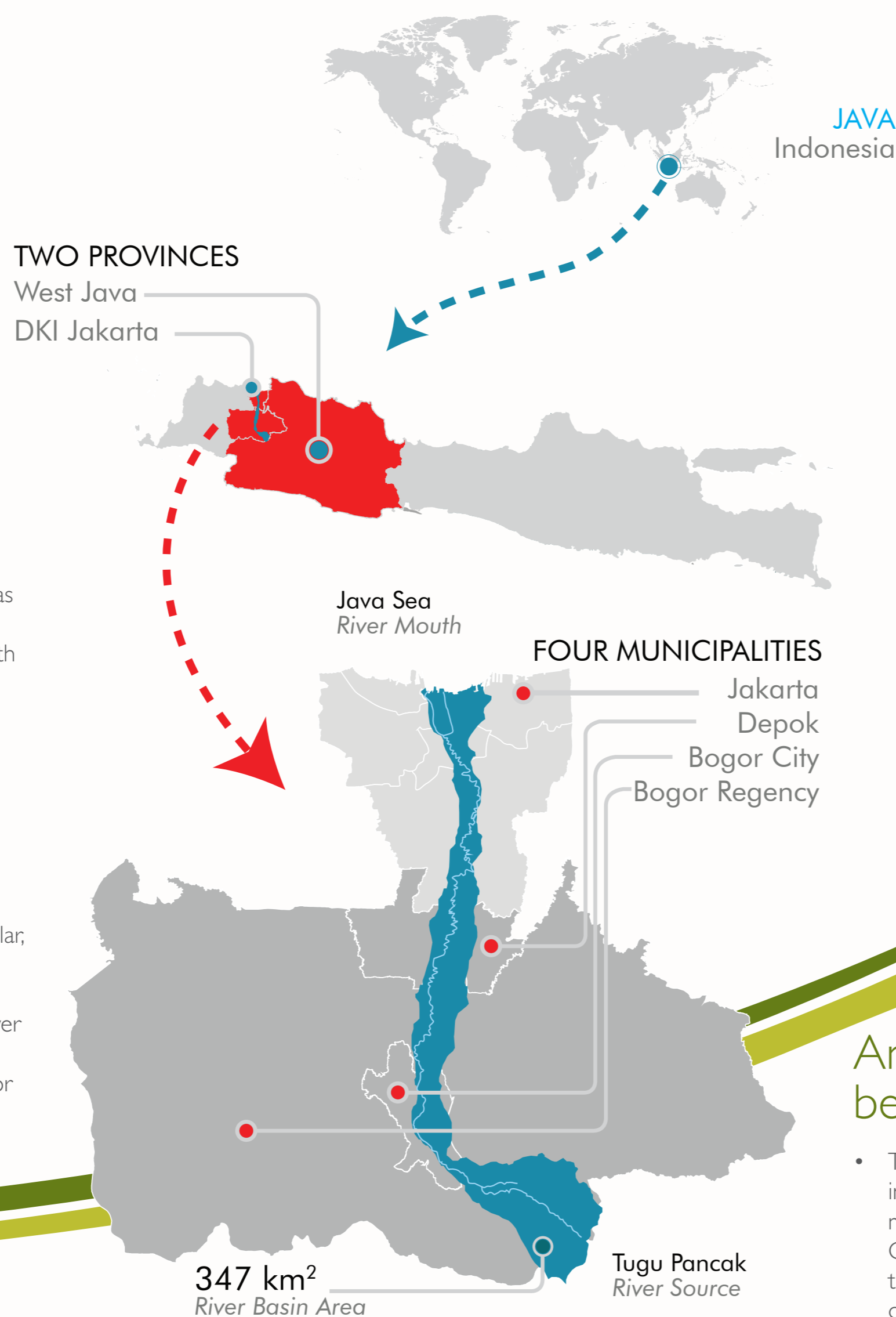
To gain understanding of transboundary river management practices, reviews of the approaches taken in Europe and the United Kingdom were conducted. Europe has a long history of transboundary river management, therefore provided useful insight. The legal, institutional, political and operational aspects of flood and river management were examined and compared to those in Indonesia. Like Europe, Indonesia's approach to water management is guided by a legal framework, and river basins planning takes place at the basin level. However, Indonesia fragmented institutional arrangement, leading to cooperation and coordination challenges, combined with limited local capacity, mean that there are challenges implementing plans practically.

## Stakeholder engagement:

The project has the support of government institutions at national and provincial level and outputs will be co-created with river basin stakeholders to ensure that impactful solutions are realised. The first of a series of focus group discussions with key stakeholders was held in September 2019. The project team has engaged with stakeholders during visits to Jakarta, including the Ciliwung-Cisadane watershed authority (BBWSCC) and the national agency for meteorology, climatology and geophysics (BMKG). The team has also visited local communities, such as flood-prone fishing communities at Maura Anke and Mat Peci, a community group for the Ciliwung, to gain their perspectives on flooding in the basin.

## Activities and outputs:

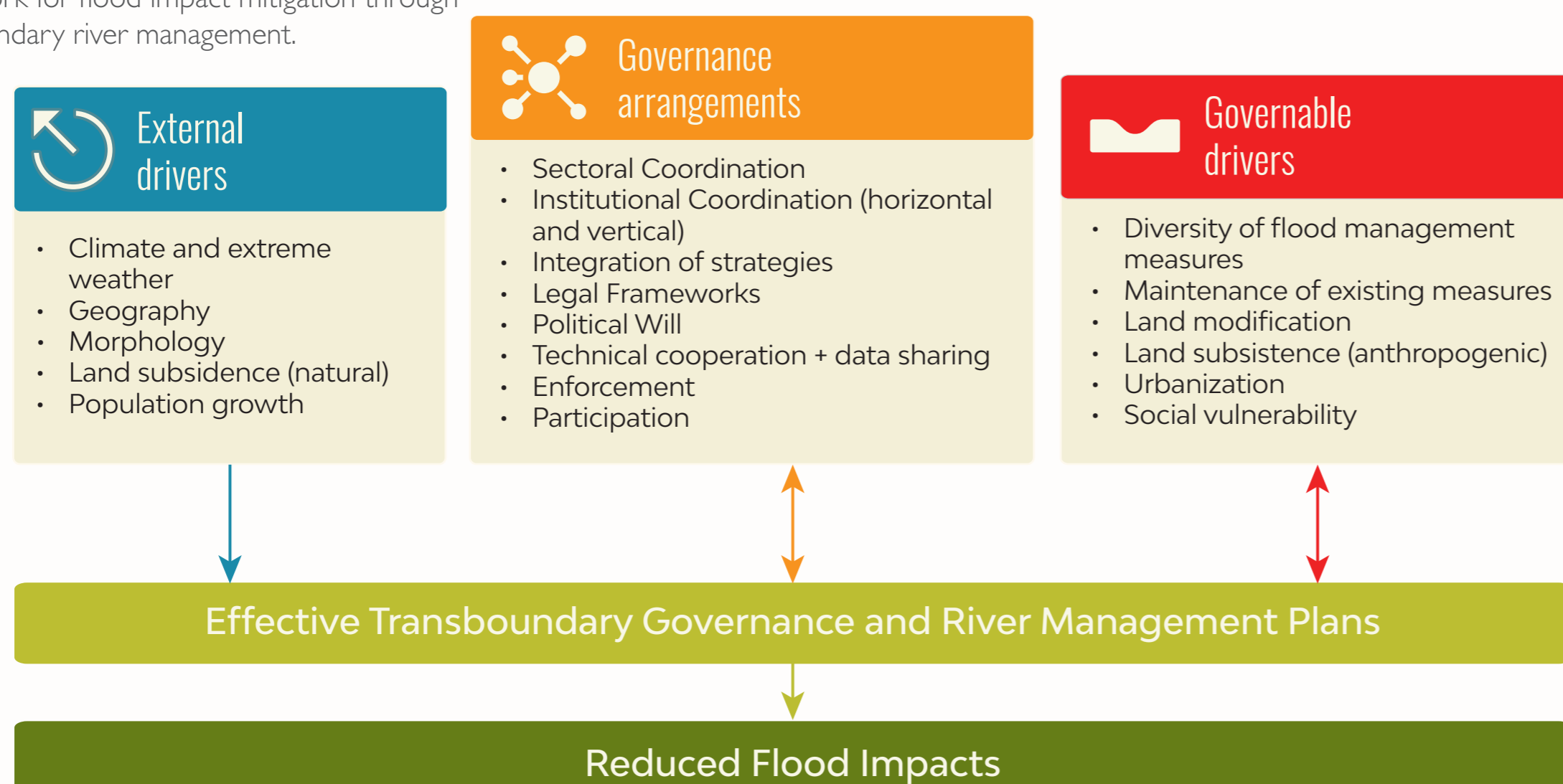
- A conceptual framework for flood management in transboundary river basins has been produced.
- A hydrological model for the Ciliwung urban downstream has been developed and will be used to conduct urban flood modelling to produce improved evaluations of flood risk, both at present and under future climate change scenarios.
- Desk studies of transboundary river management arrangements in Indonesia, Europe and the UK have been conducted to inform governance investigations.
- Empirical methods will be employed, including interviews, questionnaires, focus groups and a community perception survey, to form an understanding of the existing river governance and flood management arrangements. In particular, the institutional, political and operational aspects of river governance will be investigated. A vision paper for improved transboundary institutional arrangements in the Ciliwung River Basin will be developed, along with standard operating procedures for flood early warning and recommendations for how community preparedness can be strengthened. In addition, a briefing paper for improved transboundary river governance in urban areas elsewhere will be produced.



For more information about the project please visit [www.resilientciliwung.com](http://www.resilientciliwung.com) or contact Richard Haigh ([r.haigh@hud.ac.uk](mailto:r.haigh@hud.ac.uk)) and Dilanthi Amaratunga ([d.amaratunga@hud.ac.uk](mailto:d.amaratunga@hud.ac.uk)), University of Huddersfield, United Kingdom, or Dr Harkunti Rahayu, Institute of Technology Bandung, Indonesia.

## Conceptual framework:

Framework for flood impact mitigation through transboundary river management.



## Anticipated benefits

- The research will provide an improved urban flood risk model for Jakarta and the Ciliwung River Basin, including the potential for co-occurrence of fluvial floods and extreme coastal water levels.
- The research will contribute to an improved understanding of how transboundary governance can be improved to mitigate flood impacts and provide a model for the governance of transboundary basins elsewhere. The project will strengthen the knowledge and awareness of decision makers and foster greater dialogue between actors in the Ciliwung River Basin.
- The project will contribute to the knowledge base on how risk governance manifests in practice, how transboundary river basins can be managed more effectively as well as helping to understand which transboundary management approaches are best suited to tackling flood risk.

## Project consortium:

- Global Disaster Resilience Centre, University of Huddersfield, UK
- College of Engineering, Swansea University, UK
- Department of Regional and Urban Planning, Institute of Technology Bandung, Indonesia.
- School of Meteorology, Climatology and Geophysics (STMKG), Indonesia.



## Project partners:

At national level:

- BMKG (Indonesian Agency for Meteorology, Climatology and Geophysics)
- BNPB (National Disaster Management Agency)
- BAPPENAS (National Planning and Development Agency, Directorate of Irrigation and Water Infrastructure)



## At provincial level:

- BBWS CC (Ciliwung and Cisadane River Watershed Authority)
- BPBD (Disaster Management Office of West Java Province)
- Dinas Tata Ruang dan Cipta Karya (Department of Building, Spatial Planning and Land Affairs, Jakarta Province).



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