ICIMOD SANDEE

THE SOUTH ASIAN NETWORK FOR DEVELOPMENT AND ENVIRONMENTAL ECONOMICS (SANDEE)

The economics of solid waste management and drainage

Sustainable approaches to making South Asian cities climate-resilient

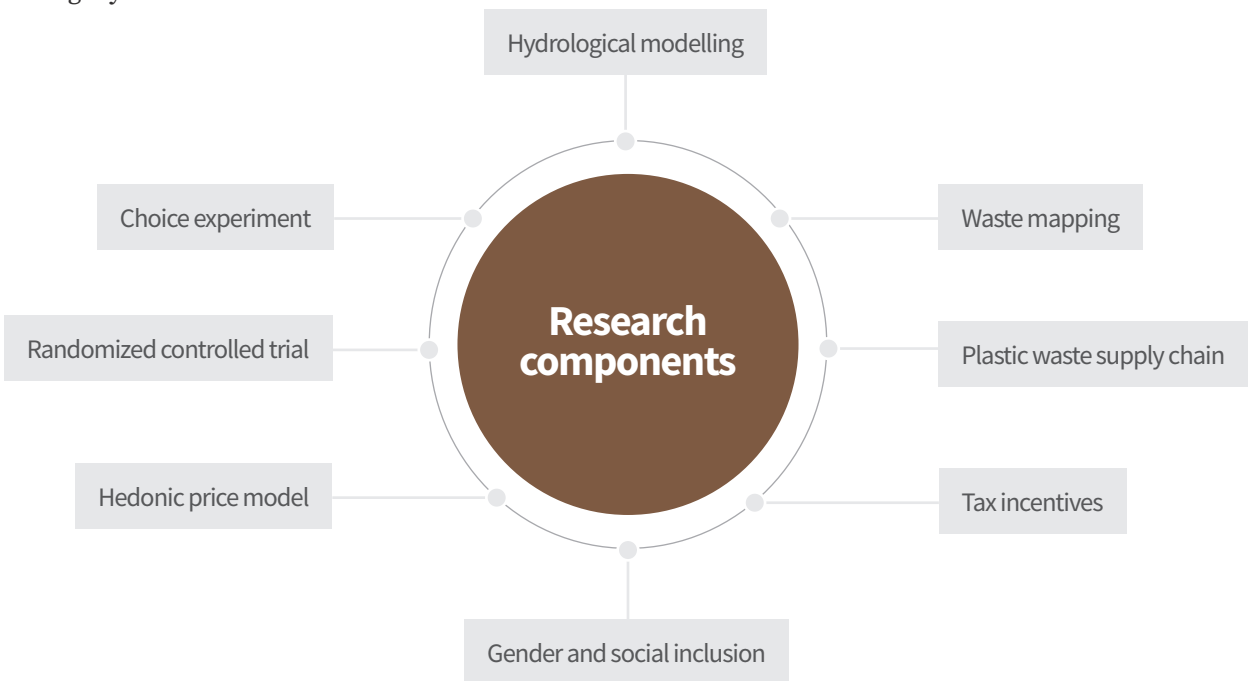
Background

South Asian cities need to adapt to extreme climate events and work with their inhabitants to develop strategies to move away from the current culture of producing and haphazardly disposing large amounts of solid waste. Cities are facing increasing threats of flooding, waterlogging, and water contamination due to the following:

- Unplanned urban growth and expansion of cities into low-lying floodplains
- Indiscriminate dumping of solid waste in the drainage system
- Intense rainfall events which can overwhelm cities' drainage systems

Objective

The Economic Analysis of Solid Waste Management (SWM) and Drainage for Climate-Resilient Cities in South Asia project seeks to generate the knowledge required to improve the resilience of South Asian cities – Bharatpur in Nepal and Sylhet in Bangladesh – to climate change through improved waste management. The project aims to help these cities cope with the issues of waterlogging and flooding, which are expected to worsen with climate change and urban growth.

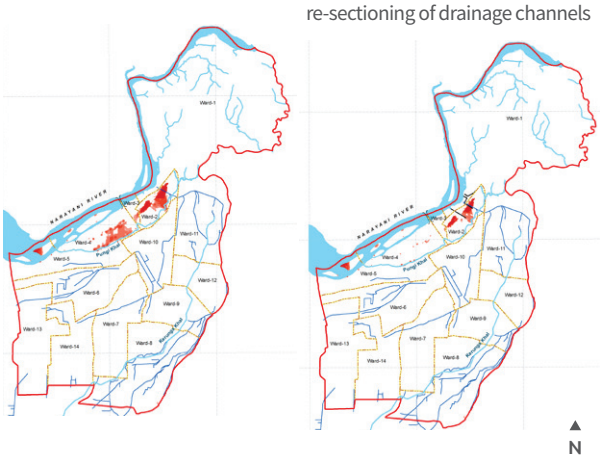


Inundation map

Bharatpur, Nepal

Baseline scenario

Alternative scenario
Rehabilitation, expansion, and re-sectioning of drainage channels



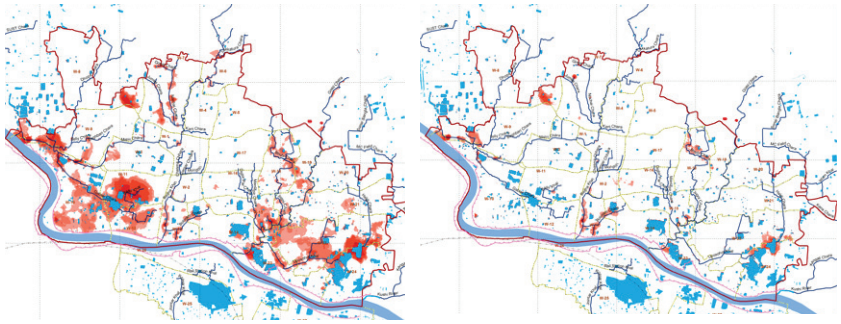
Legend
- Khal/river
- Other canal
- Proposed drain
- Ward boundary

Inundation level (m)
- Flood-free
- 0.01–0.25 (1.75 sq. km)
- 0.26–0.75 (1.35 sq. km)
- 0.76–1.5 (1.17 sq. km)
- Above 1.5 (1.17 sq. km)
- River
- Project area

Sylhet, Bangladesh

Baseline scenario
Rainfall: max. two days (1 in 10 years) and water level (1 in 50 years)

Alternative scenario
Structural interventions using regulators and pumps
Rainfall: max. two days (1 in 10 years) and water level (1 in 50 years)



Legend
- Embankment
- Railway
- Water boundary
- Water body
- Project boundary

Inundation level (m)
- Flood-free
- 0.01–0.25 (1.75 sq. km)
- 0.26–0.75 (1.35 sq. km)
- 0.76–1.5 (1.17 sq. km)
- Above 1.5 (1.17 sq. km)
- Khal
- River

Key findings

22.3%
of the land area in Sylhet and

12.7%
in Bharatpur are at risk of flooding under the current scenario

Flood risk area can be reduced to
3.6% (Sylhet)
and
5.5% (Bharatpur)
with structural interventions in the drainage system

However, despite these interventions, the area under flood risk could increase to
18.5% (Sylhet)
and
7.6% (Bharatpur)
in five years if the cities' solid waste is not managed properly

KEY MESSAGE
Structural solutions alone, without proper SWM, are almost ineffective in reducing the long-term flooding risk in these cities

Households prefer pre-determined waste collection days and timings and prefer street-side bins for pedestrians, which can be implemented with only
16.5%
additional cost

For these improvements, Bharatpur households are willing to pay
10%–28%
more in service fees

Total annual willingness to pay for improved waste collection in Bharatpur is
NPR
1.76–5.11
million

<1% additional import duty on plastic imports could help finance plastic waste management

Women are the main actors participating in waste collection and disposal at the household level

Value of cleaner neighbourhood is
25% higher
for an average housing unit if the neighbourhood has municipal SWM service compared to no such service

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