

The costs of low-intensity urban flooding and how public drainage infrastructure can help

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- Even low-intensity urban flooding can impose substantial economic costs.
- One additional modelled hour of flooding increases work over the rainy season absences by 0.56 days, raises the probability of reporting income losses by 2.4 percentage points, and increases the number of days people are unable to leave home by approximately 0.6.
- The evidence points to mobility as an important mechanism: flooding reduces local transport availability and constrains access to work and basic needs.
- Our results suggest that even modest reductions in flood exposure through improved urban drainage can generate meaningful benefits.

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Urban flooding usually makes headlines only when it is catastrophic. But for many cities, the more common experience is smaller, recurrent flooding that is poorly represented in disaster databases. This brief summarises new evidence from Barishal, Bangladesh, on how much this flooding costs households and how public drainage infrastructure can reduce those costs.

Urban flooding in Barishal

Barishal is a city of approximately 419,000 people in southern Bangladesh, and many locations in the city suffer from frequent waterlogging.

> **"Water rises even on the roads. My husband can't drive. My mother-in-law can't work. We stay here and manage with whatever is available. If there's no income, how will we eat?"**

Resident of central Barishal, qualitative interview, December 2024

Between 2023 and 2024, the city administration expanded the city's drainage network with support from the Government of Bangladesh and Germany's KfW Development Bank. New drains were constructed in areas with recurrent waterlogging. The cost of the drainage expansion in the study area was approximately USD 2.5 million.

Measuring the impact of everyday flooding

To quantify the costs of frequent, low-intensity flooding, we use a hydrodynamic model of flood duration to measure the changes generated by the new drains. We link these changes with a socio-economic survey of 2,640 households conducted after the 2025 rainy season

BOX 1 How the study measures impacts

To estimate how more flood exposure affects households, we compare households whose flood exposure changed by different amounts because of the new drains.

Drainage improvements change water movement across the drainage network affecting flooding in areas away from the new drains. Our flood model measures these indirect impacts on flood exposure.

We use this variation away from the new drains to estimate the causal effect of more flooding on household outcomes covering work, income, mobility, food access, health, schooling and housing.

Flooding increases work absences and disrupts mobility and access to basic needs

Table 1 summarises the estimated effects on work and income, mobility and access to basic needs, child health and schooling. By contrast, our results showed limited effects on physical damage to homes or belongings.

TABLE 1. Estimated effects of one additional modelled hour of flood duration

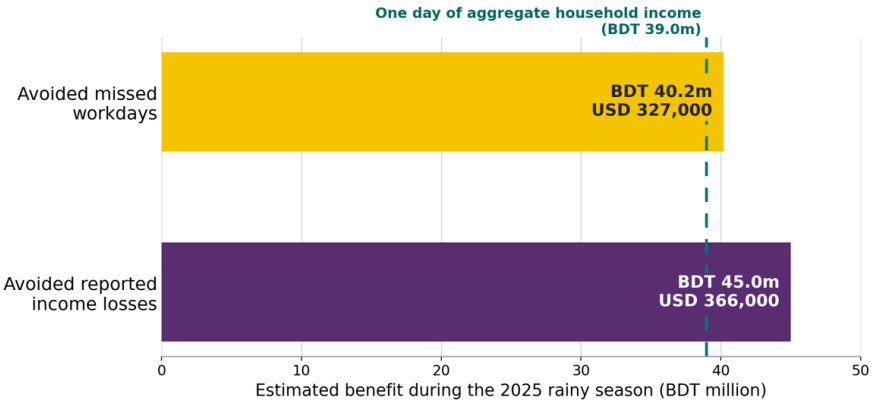
Outcome	Effect of +1 modeled hour of flooding
Work and income	
Workdays missed by household head	+0.56 days
Reported household income losses	+approximately BDT 625
Mobility and food access	
Days unable to leave home	+approximately 0.6 days
Rickshaw transport availability 5 point scale	-0.06 to -0.08 points
Unable to eat enough	+1.5 percentage points
Unable to cook	+1.6 percentage points
Children	
Schooldays missed	+0.26 days
Children with skin disease	+1.2 percentage points

Source: Budjan et al. (2026). Outcomes refer to the 2025 rainy season.

What the drainage upgrades are worth to Barishal

To estimate aggregate benefits, we combine the household-level effects on missed workdays and lost income with the average drainage-induced reduction in flood duration and scale the results across the population in the study area. The estimated benefits are equivalent to approximately 13 to 15% of the USD 2.5 million net expenditure on the drainage expansion.

FIGURE 2. Two alternative estimates of benefits during the 2025 rainy season



Note: The estimates are alternative valuations of overlapping economic losses. The workday-based estimate values avoided workdays using a daily-income proxy. The reported-loss estimate uses households' direct reports of income lost because of flooding and is less precisely estimated. Both aggregate the modeled reduction in flood duration across the 39,130-household study area. USD values use an exchange rate of BDT 122.95 per US dollar. For scale, the dashed line shows one day of aggregate household income in the study area. Source: authors' calculations.

The calculations capture only benefits to work and income during a single rainy season. Therefore, total benefits of the drainage investments exceed those monetised here.

Recommendations for policy

- **Give greater attention to recurrent, low-intensity flooding, since its aggregate costs can be substantial.**
- **Reduce the mobility disruptions caused by recurrent flooding.** By maintaining drainage capacity through routine upkeep and complementary measures such as resilient access routes and contingency plans for schools and essential services
- **Assess drainage investments beyond the construction footprint.** Investments in drainage infrastructure change flood exposure across the wider network, so cost-benefit analysis should include surrounding neighbourhoods, not only properties beside new drains.

Implementation considerations

Turning these recommendations into practice raises several practical considerations.

- **System-wide planning and maintenance:** blocked or poorly connected drains can reduce performance across the network. Agencies should coordinate construction, routine clearing and solid-waste management across adjoining catchments.
- **Financing and coordination:** to complement drainage maintenance, action by transport authorities, schools and social protection programmes can reduce remaining disruptions.

References

Budjan, A. J., Cibin, C., Imran, K., Möllerherm, R., & Pan, J. (2026). *Waterlogged: The cost of low-intensity urban flooding*. International Growth Centre. https://www.theigc.org/collections/fostering-climate-resilience-socio-economic-effects-improved-urban-drainage-bangladesh

Carleton, T., Duflo, E., Jack, B. K., & Zappalà, G. (2025). The economics of climate change adaptation. *In Handbook of the economics of climate change*. Elsevier. https://www.nber.org/papers/w33264

Rentschler, J., Salhab, M., & Jafino, B. A. (2022). Flood exposure and poverty in 188 countries. *Nature Communications, 13*, Article 3527. https://doi.org/10.1038/s41467-022-30727-4

United Nations Environment Programme. (2024). *Adaptation gap report 2024*. https://www.unep.org/resources/adaptation-gap-report-2024