



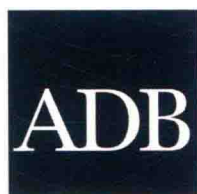
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Unflooding Asia

The Green Cities Way

Zoran Vojinovic
Jingmin Huang



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Flooding in Asia

Asia has been the victim of the most destructive floods in recent history.





Countless lives have been lost.

The environment has been heavily damaged.





The fragile economies of the region's developing countries have suffered considerable losses.

They face greater risks,
as they absorb more
and more people from
rural communities.

Asia's cities are the
more prominent targets,
especially those on
coasts or along rivers.

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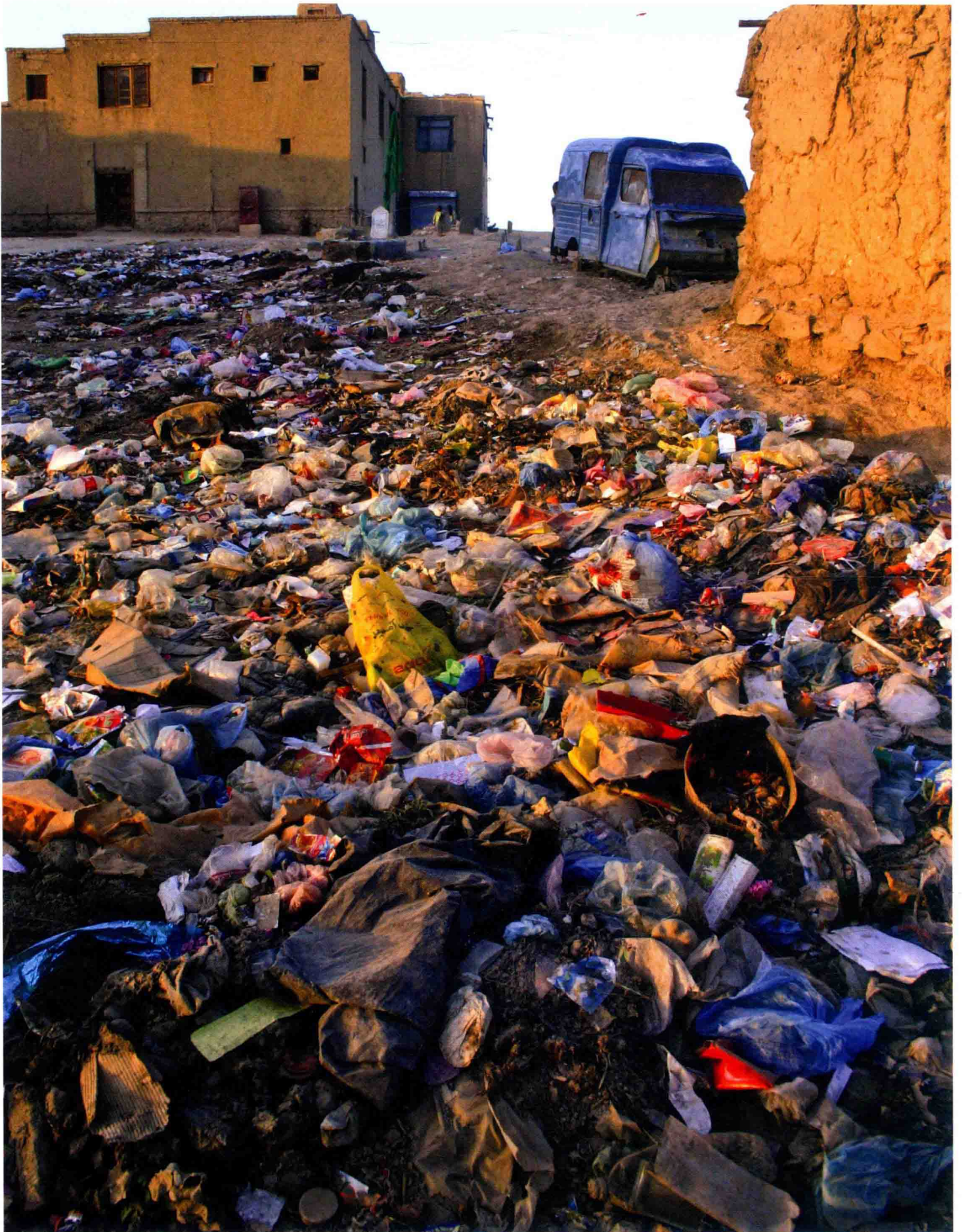
Too many people, too
many businesses, and the
unstoppable expansion
of slums have made
cities and other urban
areas more vulnerable
to floods and flood
related disasters.

Like mushrooms after
the rain, urban slums
have grown rapidly on
riverbanks, clogging
cities' waterways.

Gino Pascua

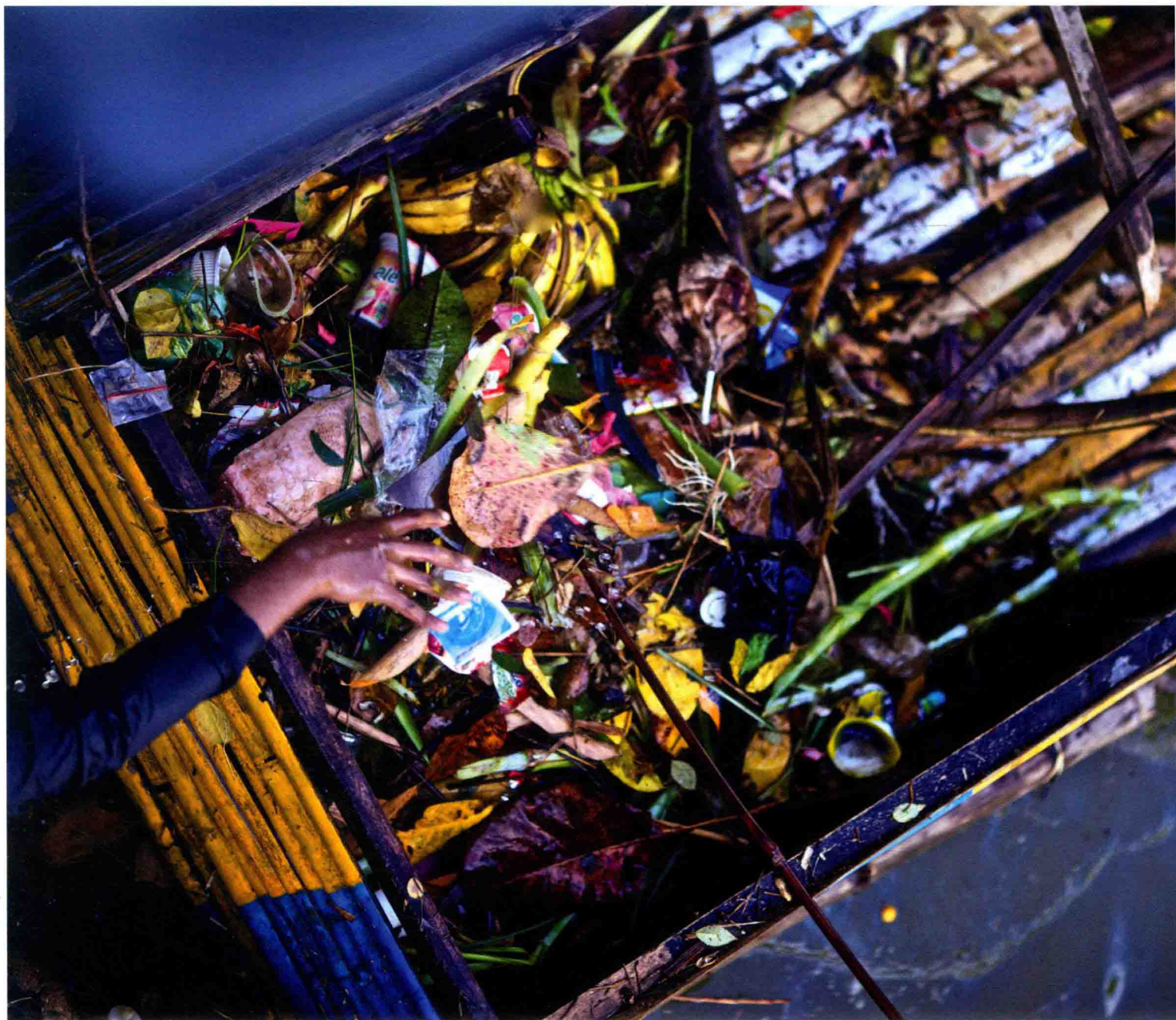






Randomly disposed garbage block urban drainage channels and waterways, especially in slums.

Sewage and stormwater runoff, when left untreated, contaminate rivers and groundwater and the settled deposits from the sewage also block urban drainage systems.



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Lack of stormwater and drainage systems contributes to flooding, and when mixed with solid waste and wastewater, the problem worsens.

Cities have been fighting floods for centuries. But despite advancements in engineering and technology, urban flooding continues, if not, increased in regularity and intensity.



Zoran Vojinovic

Today's floods are no longer caused by nature-related processes alone. Floods are the result of greater interaction between human society and the natural environment.

Traditional “flood defense,” “flood control,” and other engineering measures now seem inadequate.



Sheryl Evangelista

Increasingly, communities are learning to “live with flood risk” to be better prepared to respond to such disasters.

Types of Floods in Urban Areas

Flooding in urban areas can be one or a combination of different types according to causes



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Fluvial floods are generally due to overflowing of rivers and failure of flood defenses

Flash floods are a sudden, often destructive rush of water from a high or over sloping area, caused by heavy rainfall.



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Pluvial floods are caused by heavy rains directly over urban areas whose volume exceeds the capacity of drainage systems

Groundwater floods are caused by saturation of soil and the rise of the groundwater



Coastal floods are caused by tidal or storm surges in cities close to coasts or in deltas



Besides rapid urbanization, floods today are also caused by unusually heavy rains, shrinking of flood plains, weak flood management practices, and inefficient drainage systems.

Many cities have been the victim of these extreme climate events, and many more of such events are expected in the near future.