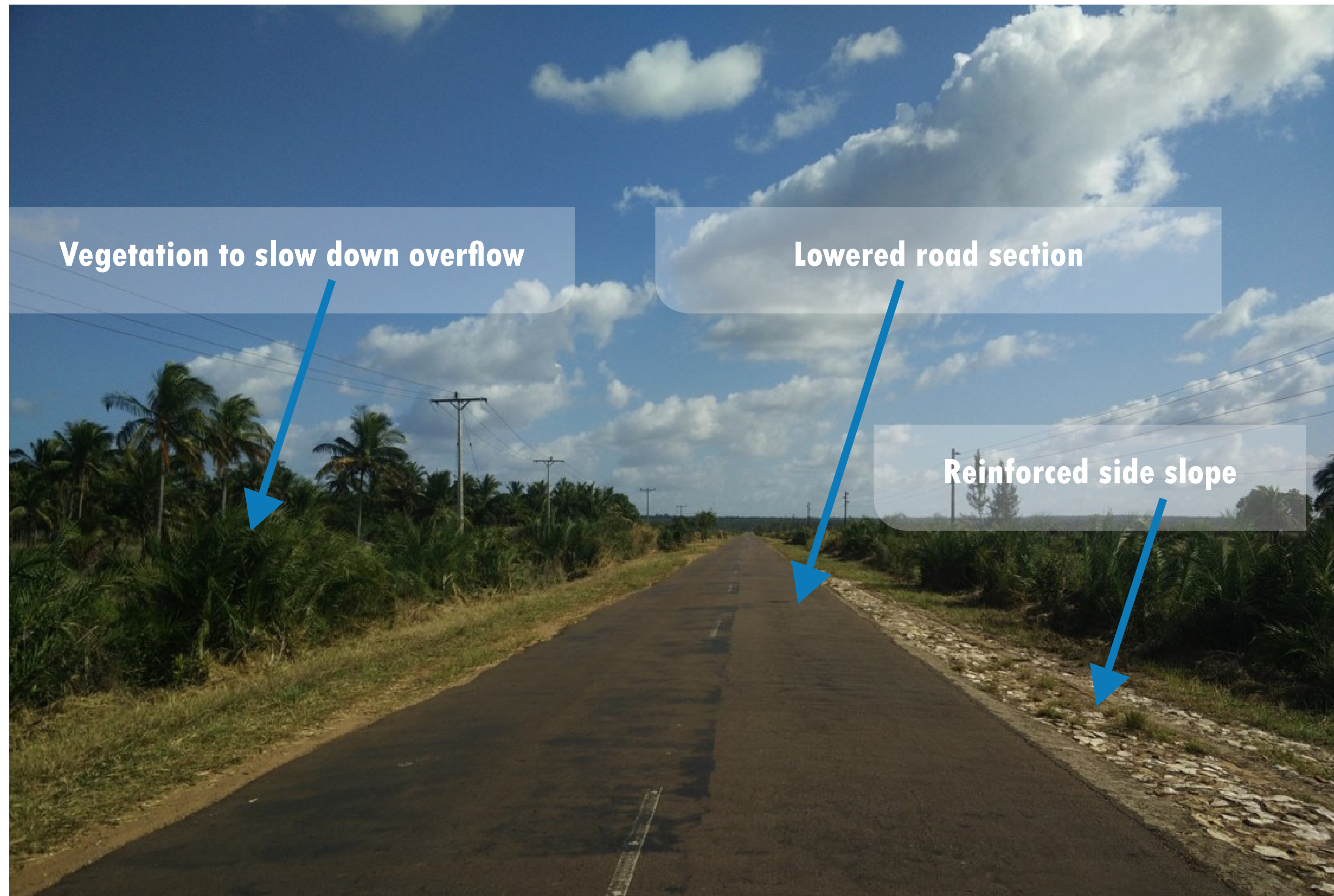


INTEGRATING CLIMATE CHANGE ADAPTATION AND WATER MANAGEMENT IN THE DESIGN AND CONSTRUCTION OF ROADS



Low embankment road in flood plain: controlled flooding and lower cost



THE WORLD BANK



ROADS CAN IMPROVE FLOOD RESILIENCE

In flood prone areas road and bridges change the surface and subsurface hydrology – concentrating run-off in smaller number of channels – causing flooding. Roads also impede drainage and create water logging, affecting the capacity to absorb high rainfall and floods. Roads and bridges also dissect flood plains – creating less ‘space’ for floods, causing breaches in unexpected places, making the floodplain wetter on the river side with less capacity to absorb high water, hence triggering floods.

Yet if managed properly roads also can be used to manage floods and improve water management in flood prone areas. Roads can improve flood resilience by:

- Avoiding that roads create floods but instead serve to manage water in low-lying areas;
- Improving flood defenses with roads;
- Using roads during and post flood emergency.

	Recommended practice
Roads for improved water management in low-lying areas	Planning roads and paths to more systematically serve as boundaries that separate high, middle and low lands
	Using gated cross drainage for water level control
	Ensure fish passages in areas where there is wild fish capture
	Have road side borrow pits to serve as drainage ditches and water storage
	Consider the possible effect of roads on sediment retention and land rise
	Excavating pond, canals to create adequate storage and for making road embankments or flood levees



Managing water levels with gated cross drainage



Low embankment road (mozambique) – saving costs and no uncontrolled floods

	Recommended practice
Roads serving as flood defense	Synchronize criteria for roads and flood embankments:
	Consider the use of low embankment roads with controlled overflows to save costs and have managed flooding
	Plan the effect on roads on wetting and drying of upstream and downstream flood plain
	Use vegetation with high value non palatable crops for side slope protection



Synchronize road and flood embankment criteria (Bangladesh)



Creating storage and road levies in the flood prone plain (Bangladesh)

	Recommended practice
Roads serving as flood shelters and evacuation routes	Prioritize the development of roads leading to emergency shelters
	Create heightened road bodies in low-lying areas to create safe routes and temporary shelters
	Create levees along vulnerable sections of the roads to protect roads and embankments, create flood and post-flood shelters for humans and livestock



Planning roads as evacuation routes



Planning roads as (post) flood shelters

www.roadswater.org

www.metameta.org



THE WORLD BANK



WATER WINDOW

