



GLOBAL
RESILIENCE
PARTNERSHIP



The Green Roads for Water Initiative aims to transform the way roads are built and maintained all over the world by incorporating water management and greening in the design and construction of roads. The aim is to improve livelihoods and resilience of communities living around roads and doing away with negative impact such as erosion, flooding, sedimentation and dust, whereas at the same time improve the climate resilience of road infrastructure itself and reduce water related road damage.

For more information visit: www.roadswater.org



ROAD INFRASTRUCTURE IN SUPPORT OF WATER MANAGEMENT AND CLIMATE RESILIENCE

What are Green Roads for Water?

- » Roads that have secure transport functions
- » Roads that are instruments for water management
- » Roads that are used for flood protection
- » Roads that reduce erosion and promote good land management
- » Roads with vegetation that controls dust and filters effluents

PROMOTING RESILIENCE: THREE LEVELS

Under a Protective resilience approach, road infrastructure specifications are adjusted to accommodate temperature rise, deal with deteriorating permafrost condition, more extreme freeze and thaw and to be better able to withstand expected larger flood peaks.

Under this protective Basic Resilience approach the road itself may be sheltered from the impact of higher flood peaks with better cross drainage. However, the landscape around the roads will suffer even more from the effects of climate change, because all extreme weather events are immediately passed on to the area surrounding the road, causing larger floods, more inundation, and

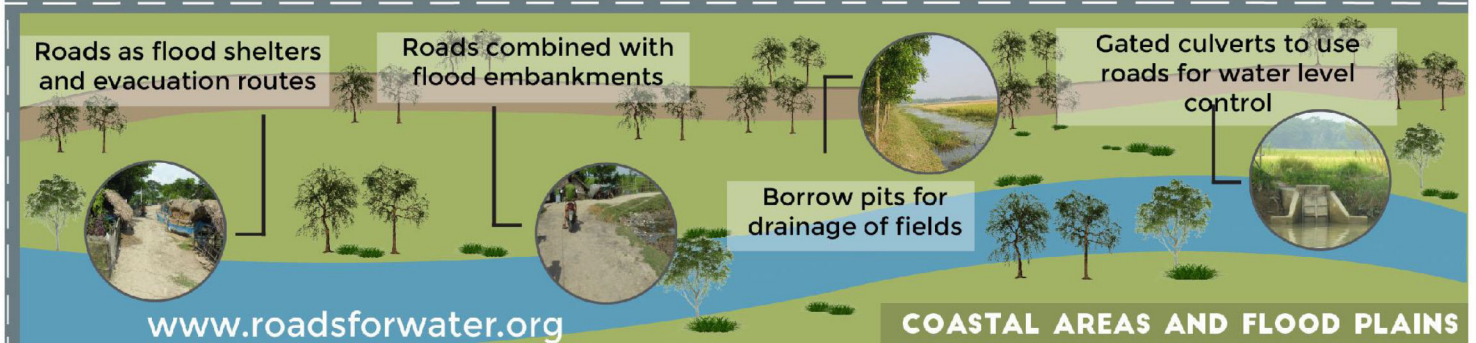
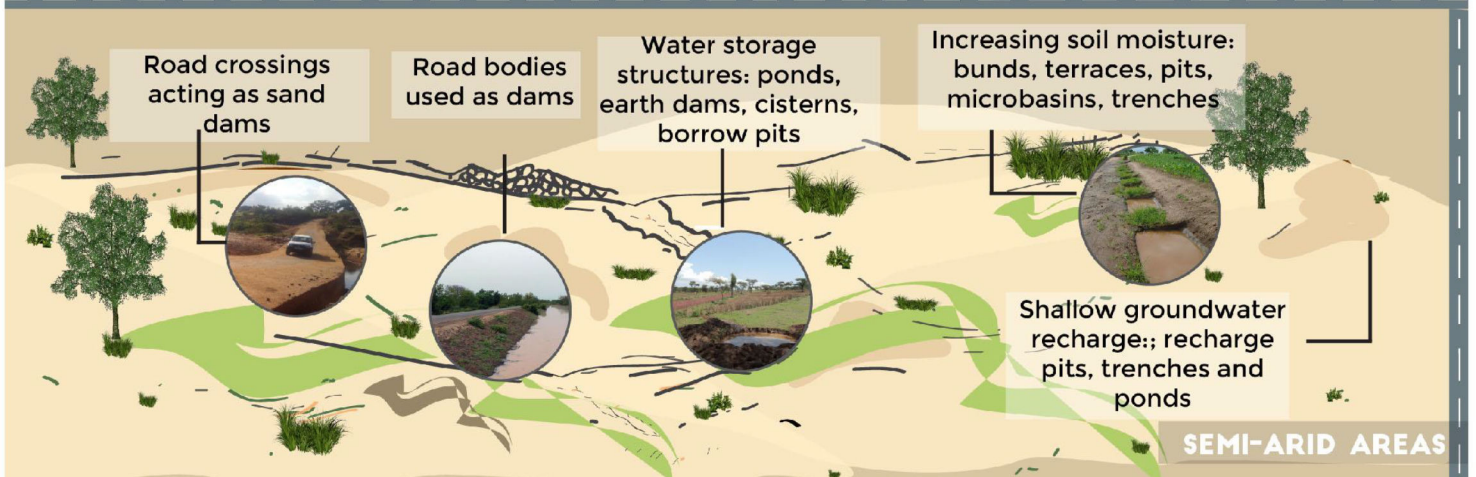
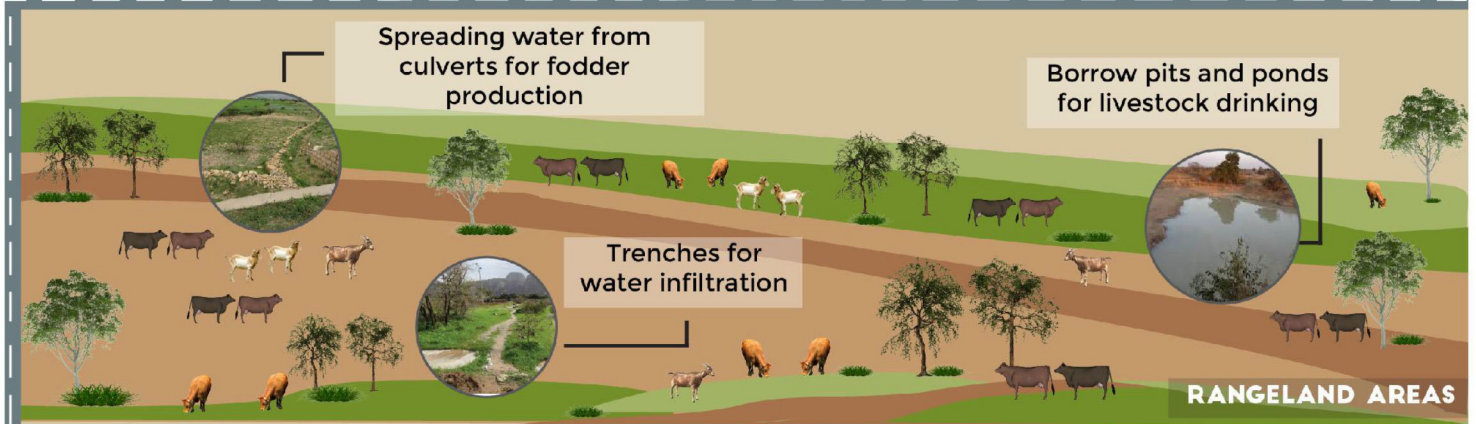
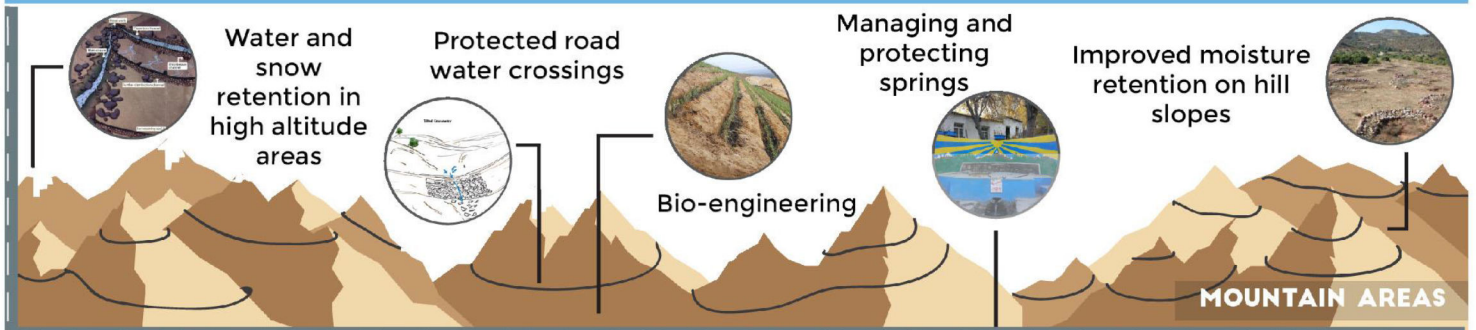
heavier erosion. The second downside is that no use is made of the road's potential to contribute to water management and greater resilience in the area of which it is a part.

Instead, we argue that by integrating water management in road development and design, a “plus” strategy to road resilience can be taken. The environment around the road is managed, and the road is made part of the landscape, even as a beneficial instrument for water management. In most cases, this roads-for-water approach will equally reduce road damage and bring down maintenance and sometimes even construction costs.

Level of Road Resilience	0	1	2
	Basic Resilience: Protective	Resilience Plus 1: Adaptive	Resilience Plus 2: Proactive
Key words	Protecting road infrastructure	Making best use of and adapting to changed hydrology	Redesigning road infrastructure to optimize the area's water management/ climate resilience
Geographies			
Semiarid areas	Catchment measures to reduce water damage to roads	Use runoff guided from roads for recharge and storage; upper catchment protection	Design roads and cross-drainage facilities to collect runoff and guide to recharge area
Watersheds and catchments	Catchment protection to protect road infrastructure	Catchment protection to protect road infrastructure	Plan road alignment and drainage structures in support of catchment management
Coastal areas and floodplains	Increase height of flood embankments to deal with higher floods	Convert village roads for water-level management with gated structures	Consider low embankment roads with controlled floodways; develop road levees in flood-prone areas; use roads for land accreditation
High- and medium-altitude areas	Have safe road water crossing and protection measures; have adequate road drainage; reconsider road alignment to higher areas; train mountain rivers to reduce exposure of roads to mountain floods	Using water-retention and land-management measures suitable to mountain areas to stabilize mountain catchment and retain moisture and snowmelt; systematic spring management	Use cut and fill instead of cut and throw methods; observe maximum slope and gentle alignments; combine roads with additional storage to and drift for torrent stabilization

GREEN ROADS FOR WATER IN DIFFERENT GEOGRAPHIES

TECHNOLOGIES AND APPROACHES



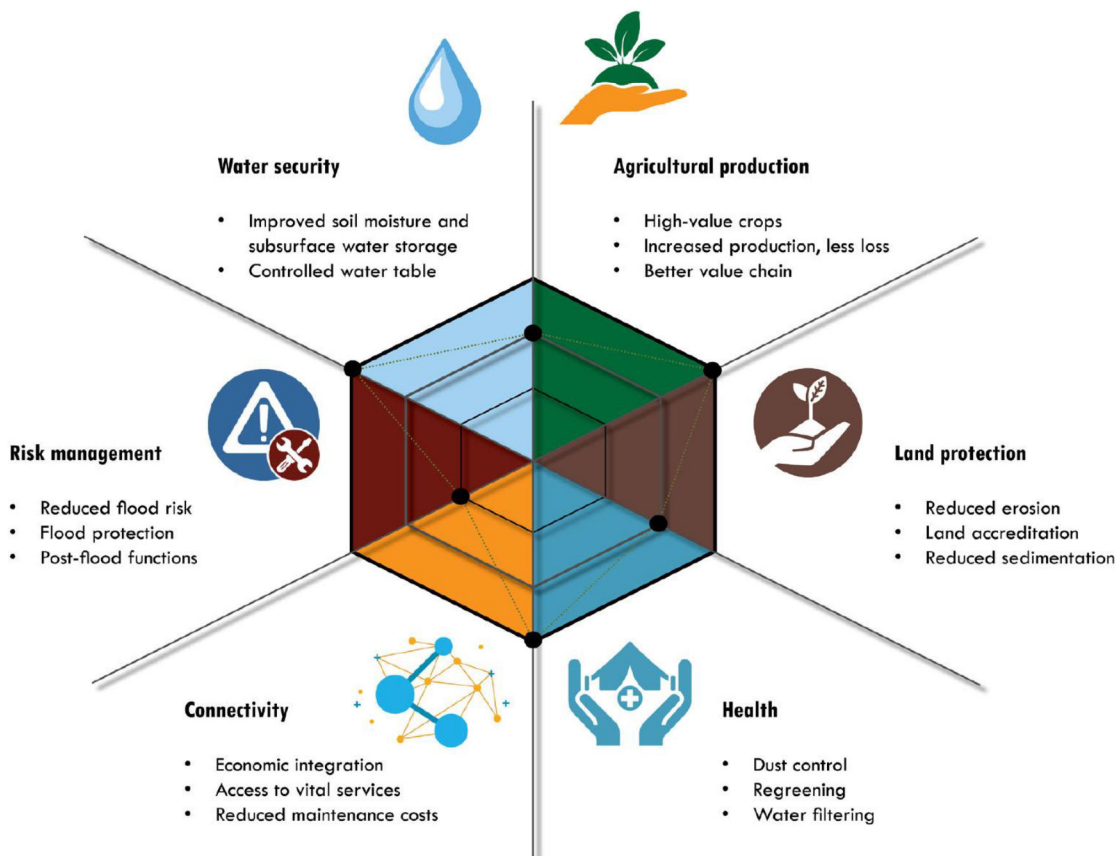
COSTS AND BENEFITS

With “Green Roads for Water,” we argue for a new approach where beneficial road water management is an integral part of the design, development, and maintenance of roads – promoting climate resilience but also tangible economic benefits. The economic case is based on a number of co-benefits:

1. Management of water with road infrastructure presents a triple win: reduced road maintenance costs; reduced landscape degradation; and productive and consumptive use of water harvested with the roads.

2. The approach has minimal costs compared to the overall outlays for road investment or road repair/maintenance. The additional costs related to design modifications, including road water management from the start, is estimated at a maximum of 5 percent of original investments planned for the road. This may be funded from climate funding top-ups for road infrastructure programs.

3. The costs associated with building roads that harvest water and manage floods provide a cheaper alternative to building road bodies with heavy new design specifications to deal with the expected impact of rain storms and other effects of climate change.



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