



Asesoramiento  
Ambiental  
Estratégico

# Nature-based Solutions for resilient roads infrastructure in Haiti

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# Intro AAE and the Project

- **Asesoramiento Ambiental Estratégico (Strategic Environmental Advice), AAE ([www.aae.com.uy](http://www.aae.com.uy))**, is a Uruguayan Environmental Consultancy Firm, established in 2012, providing advice to Organizations, Communities, Governments and Private Sector, interested in improving their environmental performance without compromising their growth aspirations and following the highest quality international standards and in line with all new international developments.
- The project presented “Guidance Document for the Adoption of Nature-based Solutions to Protect Infrastructure Assets” was financed by the World Bank and executed in consortium with Typsa and Agrer.

# Increasing infrastructure resilience with Nature-based Solutions (NbS)

## What is NbS?

NbS are actions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits (IUCN, 2016)

NbS can be used to *compliment, substitute, or safeguard* to traditional grey infrastructure while delivering enhanced resilience and a series of co-benefits

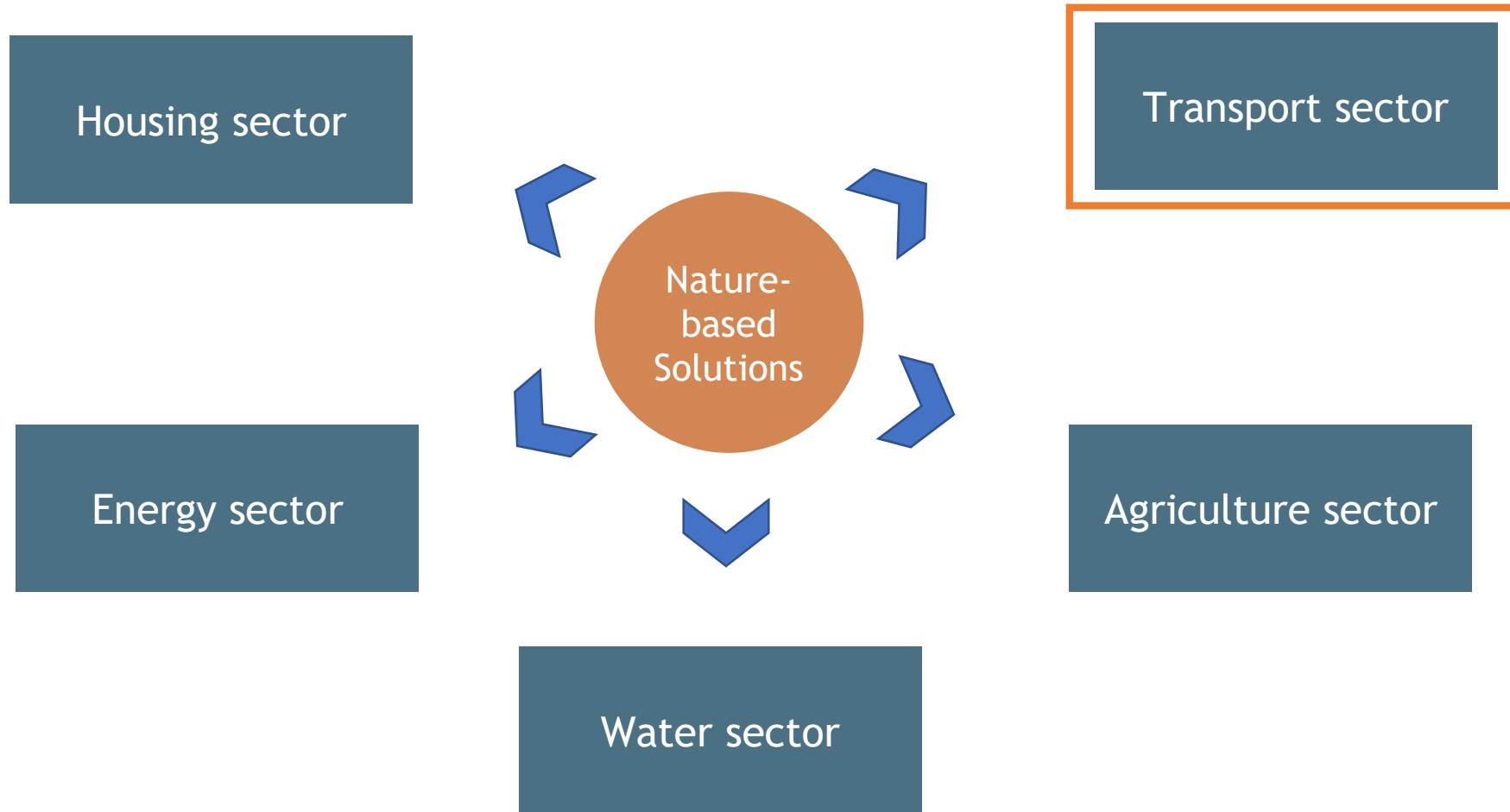
## Why choose NbS?

A. Ensuring the sustainability of the infrastructure

B. Protecting from hazards

C. Securing access to basic services for livelihoods

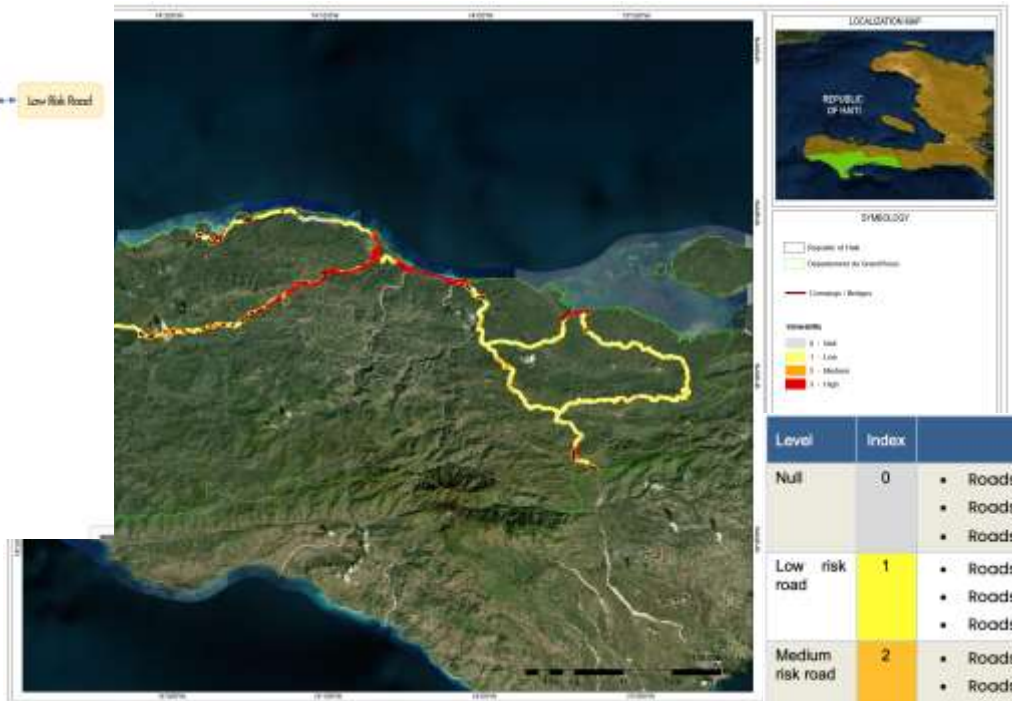
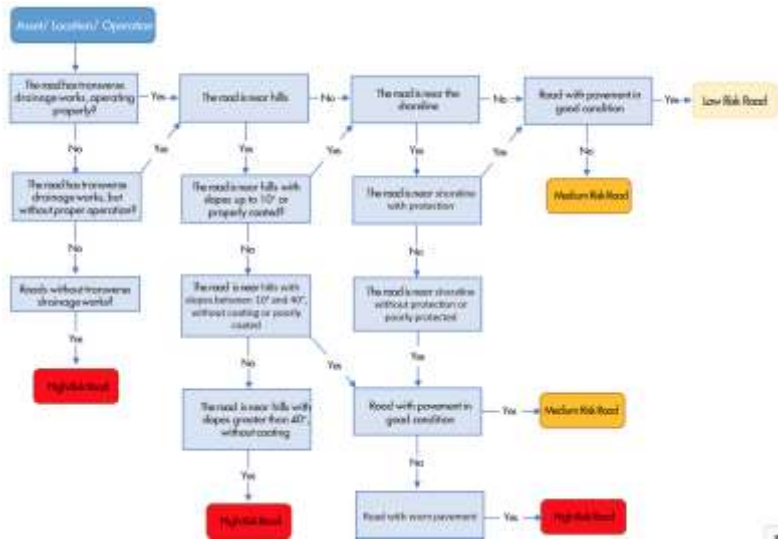
# Nature-based Solutions can be applied in different sectors



# NbS for resilient roads infrastructure in Haiti (1)

What was the problem?

Heavy rainfall, floods and landslides destroy road systems making certain areas in the island inaccessible and resulting in costly repairs and maintenance.



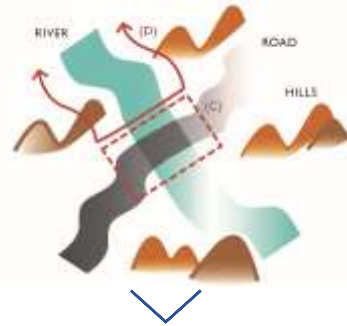
Level	Index	Description
Null	0	<ul style="list-style-type: none"> <li>Roads exposed to hills with slopes between 0 and 5°.</li> <li>Roads far from crossings and water bodies.</li> <li>Roads far from the shoreline or with an altitude above 30 m.a.s.l.</li> </ul>
Low risk road	1	<ul style="list-style-type: none"> <li>Roads exposed to hills with slopes between 5 and 25°.</li> <li>Roads near crossings and water bodies (less than 150 m).</li> <li>Roads near the shoreline with an altitude between 20 and 30 m.a.s.l.</li> </ul>
Medium risk road	2	<ul style="list-style-type: none"> <li>Roads exposed to hills with slopes between 25 and 40°.</li> <li>Roads near crossings and water bodies (less than 150 m).</li> <li>Roads near the shoreline with an altitude between 10 and 20 m.a.s.l.</li> </ul>
High risk road	3	<ul style="list-style-type: none"> <li>Roads exposed to hills with slopes greater than 40°.</li> <li>Roads near crossings and water bodies (less than 150 m).</li> <li>Roads near the shoreline with an altitude between 0 and 10 m.a.s.l.</li> </ul>

# NbS for resilient roads infrastructure in Haiti (1)

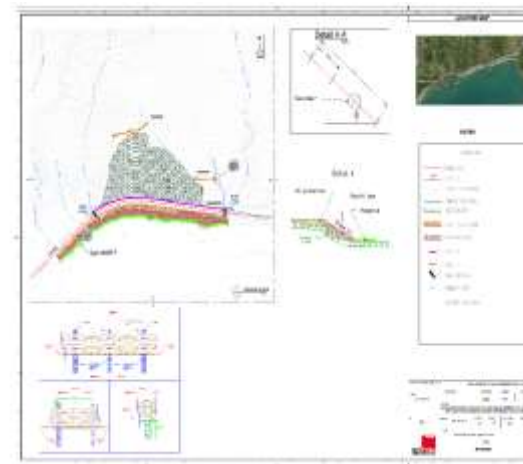
What was the solution?

Integrate NbS in road rehabilitation to stabilise infrastructure and enhance its resilience to future shocks.

## 1. Guidelines to mainstream NbS in transport sector + Catalogue with NbS



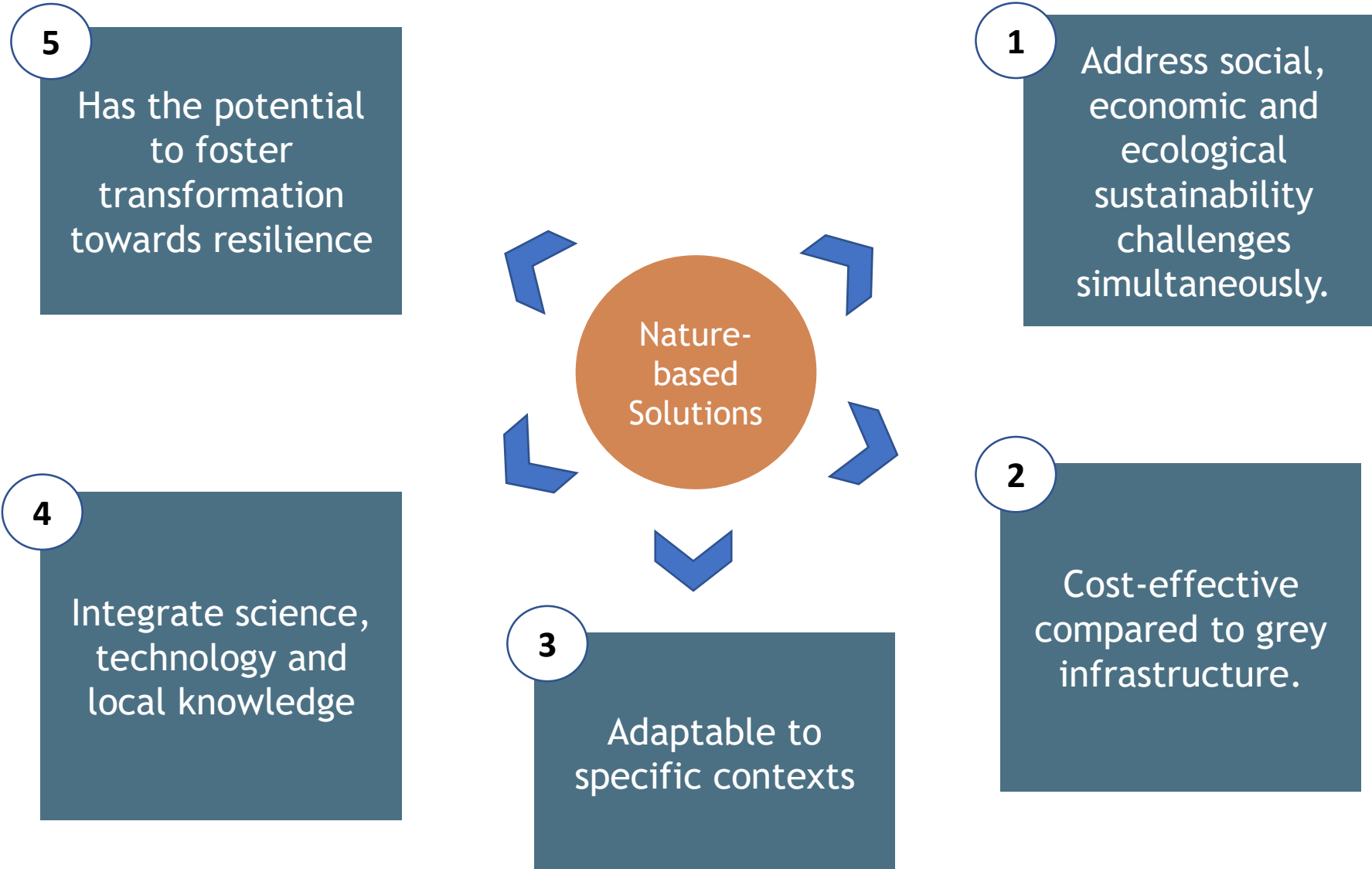
## 2. Pilot site to demonstrate NbS for road rehabilitation - Des Zanglais



- Construction of an embankment
- Implementation of a system of enrockment with a slope 2: 1 (H: V).
- **Mangrove revegetation**

Risks			Solution	Segment			Type of NBS	
Land slide	Flood	Earthquake		Mountain	Coast	Coast	Ecosystem	Hybrid
x	x	x	NBS1 - Stabilisation des pentes de montagne : principe général	x	x	x	√	√
x	x	x	NBS2 - Stabilisation des pentes de montagne avec des matériaux naturels	x	x	x	√	
x	x	x	NBS3 - Stabilisation des pentes de montagne avec des matériaux hybrides	x	x	x	√	√

# Why NbS are innovative solutions?



# Thank you!

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