



Abra de Ilog, Mindoro Occidental, January 22nd, 2020
Devis N° 19-0901

by
ECOSQUARED & GECO

Object : Feasibility study and execution of tests on site for slopes stabilization using plant techniques, to mitigate the environmental impact of the road being built in Abra de Ilog municipality and connecting Mindoro Oriental and Mindoro Occidental. The objective is to valorize an infrastructure, that participate to the artificialisation of fertile soils, in green ecological corridor.

1/ Context

The road connection between the municipalities of Puerto Galera and Abra de Ilog is an important issue for the local populations, the economic development and the accessibility of regional infrastructures. It is a strategic communication equipment desired by the governors of both province, Oriental and Occidental Mindoro.

At the dawn of Climate Change and potential important disasters along the littoral, the natural environment as well as the local communities are exposed to increased soil erosion and fertility lost. Large infrastructure works are often an aggravating factor.

But the prevention of such a surface erosion and impact of soil leaching is technically possible with well tested innovative natural techniques.

Ecological integration based on the resilience of local plant root systems allows an acceleration of natural phenomenon by biomimicry.

These plant engineering techniques are able to prevent significant direct and indirect damage from heavy precipitations.

GECO Company operates in France and internationally for over 20 years in the concrete implementation of these plant engineering techniques, using local plants but above all by integrating key decision making actors in the transmission of acquired knowledge: designers of roads and road hydraulics, earthmoving personnel, coastal planners, local farmers...

The purpose of this mission is to propose a design feasibility study :

Creation of 6 test zones on a pilot watershed.

A first visit to the site initiated with funding from the French Embassy and SEARCA, through the Forum on "Reducing Disaster Risks Towards a Resilient Agricultural Sector". allowed us to discover the particular context of the construction of the Abra de Ilog road.

The sensitivity of the agricultural areas on the hills and in the plains, the rich biotopes of the Udalo rivers & Bugtong rivers and also the marine protected area planned downstream convinced us of the urgent need to work to prevent major damages to come.

The proposed mission will rely on the knowledge of local actors, farmers and local indigenous populations, to supply the local plants necessary for these pilot demonstration areas.

This intervention is planned on a vast earthworks site, already underway, a total integration of the teams will be required in terms of coordination of the progress, accessibility of the areas and compliance with safety rules.

GECO is a company certified in quality assurance and compliance with European procedures to operate on motorway, rail and petrochemical infrastructure in France.

2/ Udalo river watershed case study

This catchment area with an area of 42 km², constituting an important reservoir of biodiversity, forest cover and traditional and commercial agricultural areas, and drinking water resources.

The Udalo Watershed map with the planned road in orange



FAILURE to take into account the ecological integration of this road section on this socio-ecological system will generate the following IMPACTS:

1. Long term soil stabilization problems (plants do not have time to adapt IN DEPTH to heavy soil restructuring) :
2. Erosion of road shoulders, scour of civil engineering works, collapse of gabions, etc...
3. Leaching of fine materials and diffusion over kilometers downstream of colloidal clays leading to a general siltation at the accumulation points.
4. Release of large stocks of more or stable mineral sources: nitrogen, phosphorus, potassium (or Natrium, Phosphorus, Kalium) Arsenic, etc. which can locally cause toxicity levels for human health and eutrophication of aquatic environments,
5. Degradation of the ecological state of rivers, the river but also on the corals downstream

6. Indirect impact on the populations that consume this water directly, or on piezometers (tubewell) less than 8 m deep, weakening of the fishing activity in fresh waters and on the coast
7. Loss of ecosystem continuity and connectivity for local wildlife, partitioned on both sides of the road over 50 m wide, 25 km long, crossing 4 watersheds of coastal rivers.

3/ Technical proposal

Feasibility study of remediation with planting techniques

- Rencontre des acteurs de l'aménagement routier; choix des zones tests d'intervention
- Choice of most suited plants able to development of root systems by sowing or vegetative propagation to accelerate deep soil recovery
- Definition of intervention typologies and creation of profiles across the 6 planned development zones

Réalisation et encadrement de chantier test

- Collection of local seeds, hay or mulch from surface plants
- Collection of seedlings, cuttings, planons (fragments of branches) or living stakes in the Udalo river catchment area
- Manual leveling of planting trenches in contour lines or stony cords
- Implementation of techniques of dead fascines, living fascines and embankment structuring by beds of plants and seedlings

NOT INCLUDED IN THE SERVICE QUOTATION

- 3 days of 22 t hydraulic shovel for pile jacking and piling of the embankments for plant bed technique
- 1000 m² of coconut geotextile, 2 m wide, 740 g / m² for localized anchorages.

4/ Financial proposal

Feasibility study and construction of embankment stabilization test sites in plant techniques in the municipality of ABRA de ILOG

	Unit	Quantity	Unit Price	Sub total
FEASIBILITY STUDY				
Governance & stakeholders approach, communication & awareness	Ft	1	5 000 €	5 000 €
Ecological engineer services specialized in ecological engineering (F ROURE)	jour	20	500 €	10 000 €
Train + plane + boat tickets from our headquarters in the GARD (France)	FT	1	900 €	900 €
Daily package on site	Ft	20	50 €	1 000 €
Support team leader specializing in plant engineering	jour	20	300 €	6 000 €
Travel from our headquarters	FT	1	900 €	900 €
Daily package on site	Ft	20	100 €	2 000 €
Local logistics and translation	Ft	1	3 000 €	3 000 €
CHANTIERS TESTS				
Local hiring of employees for the plant preparation and implementation phase 6 to 10 employees	Ft	1	2 000 €	2 000 €
<i>TVA autoliquidée</i>			<i>TOTAL HT</i>	30 800 €

Invoicing terms

30% on order, the balance at the end of the stay, by bank transfer.

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