



## Pilot site for erosion control: Diogué Island Action plan and agreement between partners

Patrick CHEVALIER, 2 April 2022

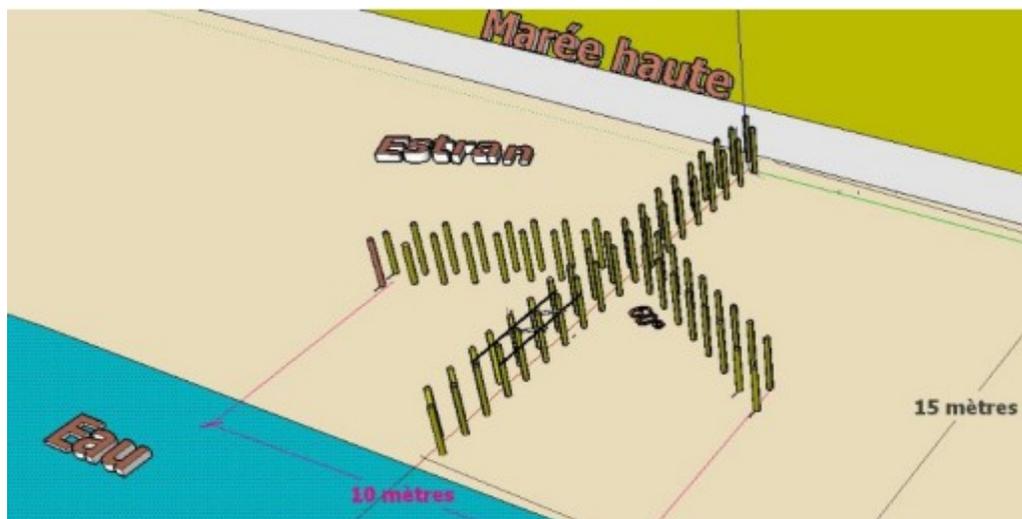
This document specifies the work to be carried out and the commitments of each partner on the Diogué island erosion control project on Diogué island, during the phase of the project financed by the French Embassy

This phase concerns the protection of a large southern beach of Diogué (1200 metres). From the point of the military camp in the East to the Ghanaian spur and the effects it produces over 200 metres to the West. It will last for 8 months between May and December 2022. After this period, the inhabitants will maintain and monitor the project themselves.

### 1. Permeable groynes in two phases (80 posts per phase)

After having tried several techniques(1). we know that what works in the long term and over a large length of beach is the following technique:

Airplane-shaped permeable spikes (with two wings), made up of two rows of stakes spaced 40 cm apart. The posts in a row are 80 cm apart. For the construction see technical note n°1.



The basic spur is therefore 15 metres by 10 metres wide. It is built at the top of the beach at the level of the high tide line for a large tide of coefficient of 80. It descends to the limit of the low tide tide.

For a 15 metre long and 10 metre wide groyne with two 7 to 8 metre long wings, 2 rows of 20 stakes in the length and 2 x 20 stakes for the wings are used.

If 20 poles in the length and 2 x 20 poles for the wings then  $40 + 40 = 80$  poles  
We also know that we have to build cobs that are not too long in stages, in order to maintain them well.

We extend towards the water when you have gained sand. There are two phases in the construction of a cob:

1. Phase 1: Start from the high tide line (high tide - coefficient 80)
2. phase 2. when the sand has risen to the wings, a second identical groyne is added

For this phase 2, you can proceed in several stages: first extend the vertical axis over a few metres then the wings and then the vertical axis at the bottom. The length can be adjusted before building the wings according to the result.

For example, if you see that the waves are making grooves in the sand, you can build the wings earlier. The wings should be about half way between high and low tide, where it moves.

*1 Two lines then one line, with or without wings, horizontal fins at the bottom, or vertical fins blocking the sand.*

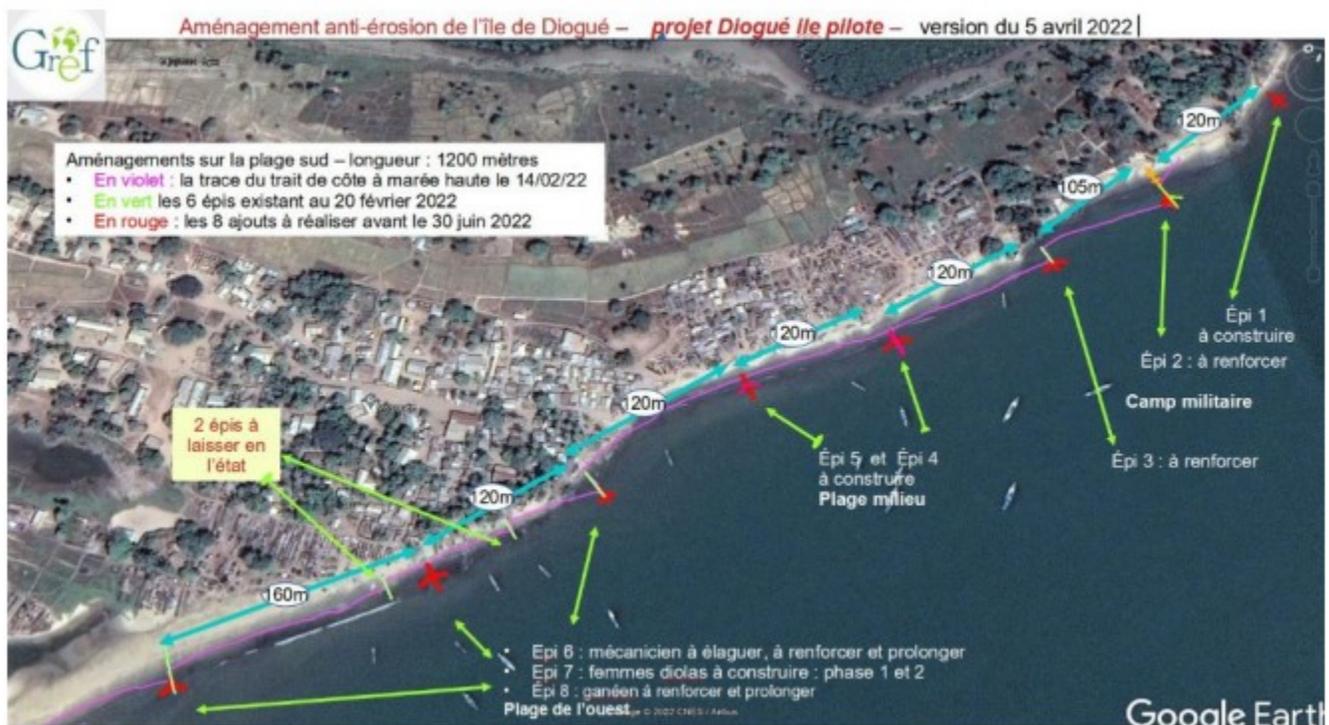
## 2. The overall plan

The 1000-metre beach will be equipped with 8 groynes placed every 100 to 160 metres according to the diagram below.

The 4 groynes in place (n°2, 3, 6, 8) are shown in green.

They need to be reinforced to have 2 rows of poles in the parts still affected by the water and are therefore extended by a phase 2 (in red) with wings.

We also see the 4 new groynes (n° 1, 4 5, 7) to be built with phase 1 then phase 2.



This plan will be drawn up in A4 format. It will be used for the initial layout. It can be modified by a meeting with the 4 parties: the site manager, the person responsible for measurements, the scientist and the project manager.

### 3. The stages of the site

Stages 1 and 4 are carried out by the military. They do not count in the total number of poles.

Stages 2 and 3 should take place in May. Depending on the availability of posts and the number of people available to install the spikes of course.

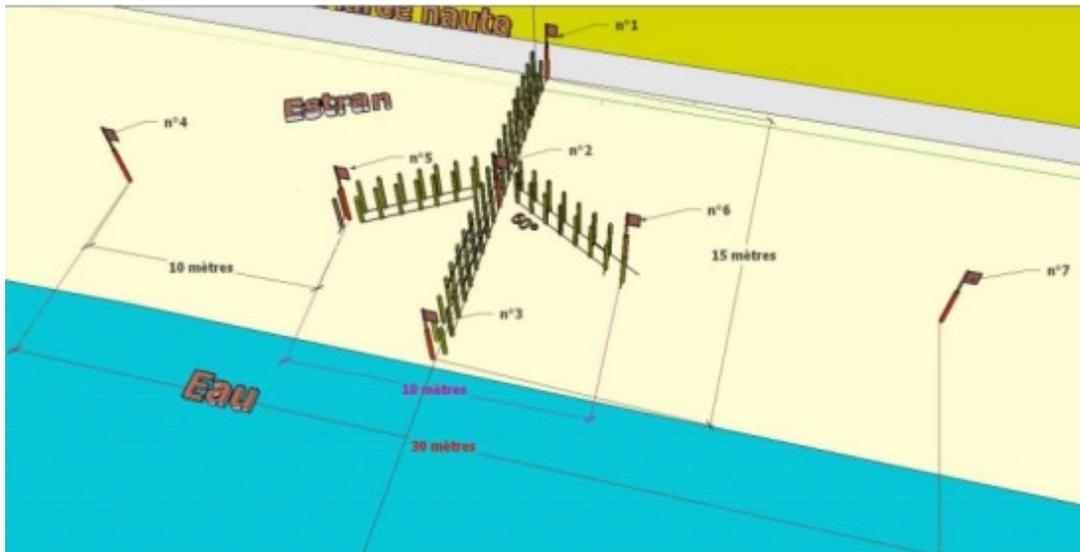
This will allow for a West to East effect before the winter and to receive the sand from East to West from July onwards for a good result in October.

July for a good result in October before the end of the project.

Stage	Definition	Stakes	Human Resources
1	Construction by the military of spur 1 (April)	80	2 days with 5 people
2	Construction phase 1 of the 3 spurs: n° 4 and 5 and 7 (May)	240	6 days with 5 people
3	Reinforcement/extension of spurs 2, 3, 6, 8 (May)	320	6 days for 5 people
4	Extension of spur no. 1 (June)	80	2 days with 5 people
5	Extension of groynes 4, 5, 7 (July)	240	6 days for 5 people
6	Maintenance of the 8 groynes and site monitoring (June to December)	80	2 people 1 day per week i.e. 64 days
	Total	880	90 working days + 64 days of monitoring

### 4. The measurements

Each ear of corn shall be provided with 7 measuring marks marked at 1.20m (120 cm) from the ground with a notch and a cord. Here is the arrangement of the marks: 5 will be located on the cob itself and two will be located on two additional stakes that will have to be watched to avoid losing the measurement.



**3 stakes on the central axis** (n°1 at the top, 2 in the middle and 3 at the bottom)

**2 stakes on the ends of the wings** (n°5 and 6)

**2 stakes at 10 metres from the wings on the right and left** (n° 4 and 7)

There will therefore be two alignments for monitoring the beach profile in two directions:

- in the height of the beach: alignment of marks 1, 2, 3
- along the length of the beach: alignment of marks 4, 5, 2, 6, 7.
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**These marks will be repeated on the phase 2 spur when the marks of phase 1 are dry.**

The following 5 measurements will be made on each of the 8 spurs:

**1.** The height of the sand on the 7 posts. For example, if a height of 1.20 m is measured between the marker and the ground, this means that no deposition has taken place, 1 metre means 20 cm of deposition. each month.

**2.** landscape photos of each structure to show maintenance and any changes (e.g. missing stakes or excess leaves blocking the sand) at the start of construction and in case of modification

**3.** **GPS** tracks taken with **OsmAnd** (a drone?) along the entire length of the beach, at slow speed, on a day with a tide of about 80.

You have to walk on the coastline left by the sea at high tide (sea line) each month

**4.** photos taken at an altitude of 10 metres along the axis of the coastline towards the west. They will be taken every 2 months (at the beginning of May, July, September, December) see the Drone's instructions for use

**5.** two photogrammetric surveys of 200m\*30m allowing in particular to edit a coastline from from the odm\_orthophoto file. Over the 8 months, 2 surveys are planned: a first one in month 2 or 3 and a second one in month 8 or 9.

Measurements 1, 2, 3 and possibly 4 will be carried out by the teachers and will be communicated to the scientist via Whatsapp.

At the start of the project we will also take measurements of the speed of the current at key points at

- mid-tide in each direction by measuring the time taken by a stick thrown at the end of the cob to travel 50 metres... We will measure the speed at mid-tide in both directions, at about 20 metres in both directions, at a distance of about 20 metres from the bottom of the groin, noting the difference between the two directions.
- a sediment sample at the same locations to measure the turbidity of the water.

This regularity in the measurements is necessary to highlight the effects and to improve the groynes. A processing will be carried out by the scientist and the project leader and sent back to the teachers.

## 5. Tasks and responsibilities

Here are the 5 partners and their involvement.

### **A. Justice and Development: in charge of implementation**

It is responsible for the financial and material management of the project. It receives the funding from the French Embassy, executes the planned budget, remunerates the participants and pays the expenses. He/she ensures the follow-up of the implementation. A facilitator will participate in the start of the work and will ensure a follow-up every two months.

An estimate of expenditure will be drawn up at the start of the work and a report will be sent to the project leader at the end of each month and communicated to the Project Manager at months 2, 5 and 7

### **B. The GREF: project leader**

He coordinates the work. It provides the overall plan (this document) and the technical note.

He provides advice for the measurements, ensures their processing and formatting. He writes the 3 technical reports on the progress of the work and the results in months 2, 5 and 8

He will visit the site in July halfway through the project,

He intervenes on a voluntary basis. He will pay for his own travel and accommodation expenses.

**A scientist** will work with GREF to advise on the measurements, process the data and make recommendations for improvements to be made.

He will go to the site at the start of the project to facilitate the installation of the spurs, set up the measuring posts and train the schoolteachers.

### **C. The site manager and his assistant**

They ensure the coordination of the works according to the plans provided in this document and the technical note.

- Supply of stakes. They will order the stakes in advance from the young people. They will use the budget for the 840 posts.
- Installation of the spurs: cutting and planting of the stakes, reinforcements, palms according to the plans provided. This requires prior tracing on the sand.
- Maintenance of missing or capsized posts

They communicate to the project leader any proposals for modification that prove useful, taking into account the observation and the difficulties encountered.

#### **D. The primary school: the measures**

The primary school is responsible for measures 1, 2, 3 and possibly 4 (after training).

They transmit their data to the project leader.

The two teachers will visit the site every week to identify any deterioration.

#### **E. The military**

The military camp is responsible for the construction of spur no. 1.

It provides the stakes and builds the spur according to the plan and instructions.

The measurements for this spur are taken by the primary school.

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