

Integration of artisanal fishermen's cooperatives in blue growth: development of new technic for shellfish breeding and seaweed culture

Mohamed Naoufal TAMSOURI¹; Mohamed IDHALLA², Mohamed IAZZA¹ and Fatima EL AAMRI¹

¹ CSZIAM, National Institute of Fisheries Research (INRH), M'diq, Morocco. *E-mail: tamsouri_naoufal@yahoo.fr

² Department of Aquaculture, National Institute of Fisheries Research (INRH), Casablanca, Morocco

Introduction

Artisanal fisheries have been a major source of food, employment, and economic benefits to the inhabitants of the Mediterranean coastal villages (Gómez et al. 2006). However, in the last decade, these fisheries have known an overexploitation (Prato, 2016) which have a negative impact on artisanal activities. Indeed, the fishery has declined remarkably in many parts of the Mediterranean basin with a downward trend in the number of vessels and licenses, catches, and net revenues (Gómez et al. 2006, Guyader et al. 2013, Lloret and Font 2013, Di Franco et al. 2014) and like other countries, artisanal fisheries in Mediterranean part of Morocco no are exception.

In the aim to contribute in the development of the blue economy and to improve the net revenues in favor of cooperatives of artisanal fishermen aiming at small-scale aquaculture in the Mediterranean coast of Morocco (shellfish and seaweed culture). The Marine Aquaculture Technology Laboratory of National Institute of Fisheries Research of Morocco in partnership with JICA tested the technical feasibility of a new mooring system, simple, easy to transport and to immerse which is based on the use of resistant bags instead of the concrete block witch expensive from the point of view of manufacture, transport and immersion.

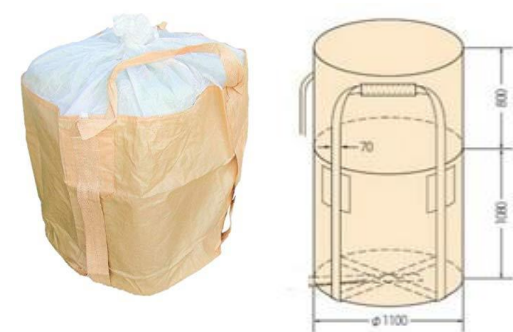


Figure 1 Big bag used for mooring system

Table1: Characteristics of the bag.

Characteristics of the bag	
Size	1100x1100mm
Resistance	1000 Kg
Bottom	Flat
Top	Filling skirt
Lifting strap	Two reinforced straps

Materials & methods

The technic consists in using the big bags whose resistance is superior than 1 ton (Fig. 1 Tab. 1) filled with small gravel bags inside the small boat in order to simplify the transporting a big weight (one big bag contain 6 gravel bag each one weighs 60 Kg, in total 360 Kg/big bag) (Fig. 2).

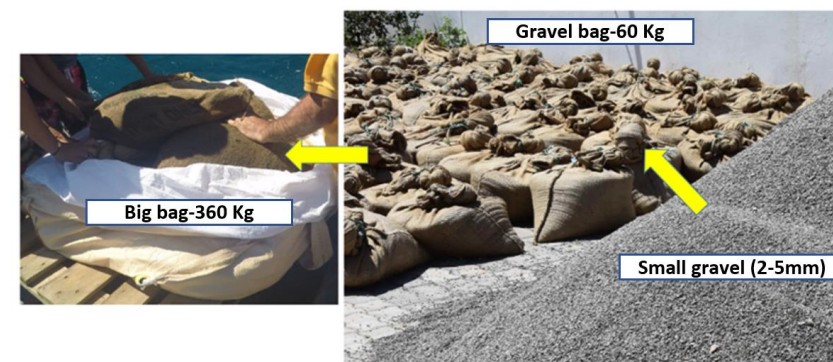


Figure 2. Operation to fill 60Kg of gravel/small bag.

The transport of the mooring system (including the longlines) and the immersion operation were done by artisanal fishermen and their small boats (Fig. 3) and it was carried out on July 2019.

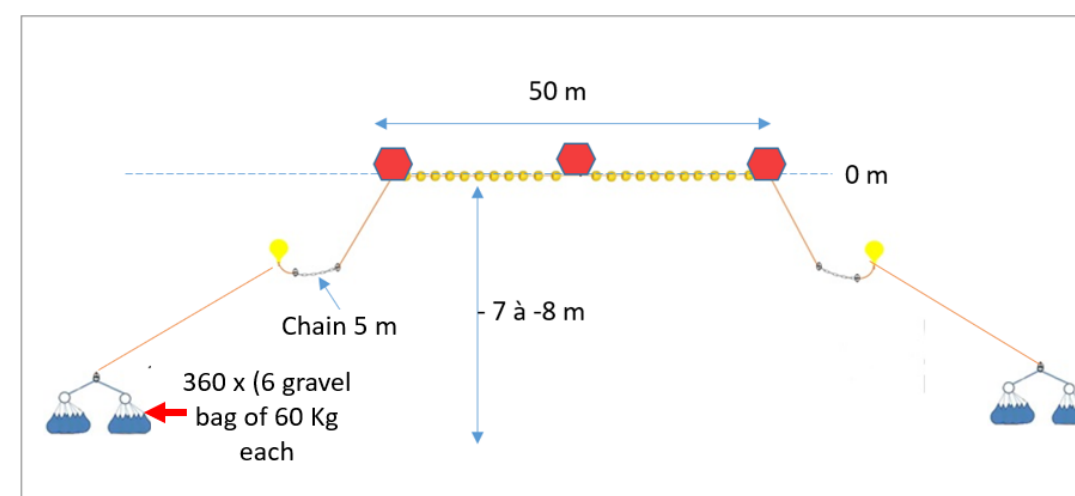
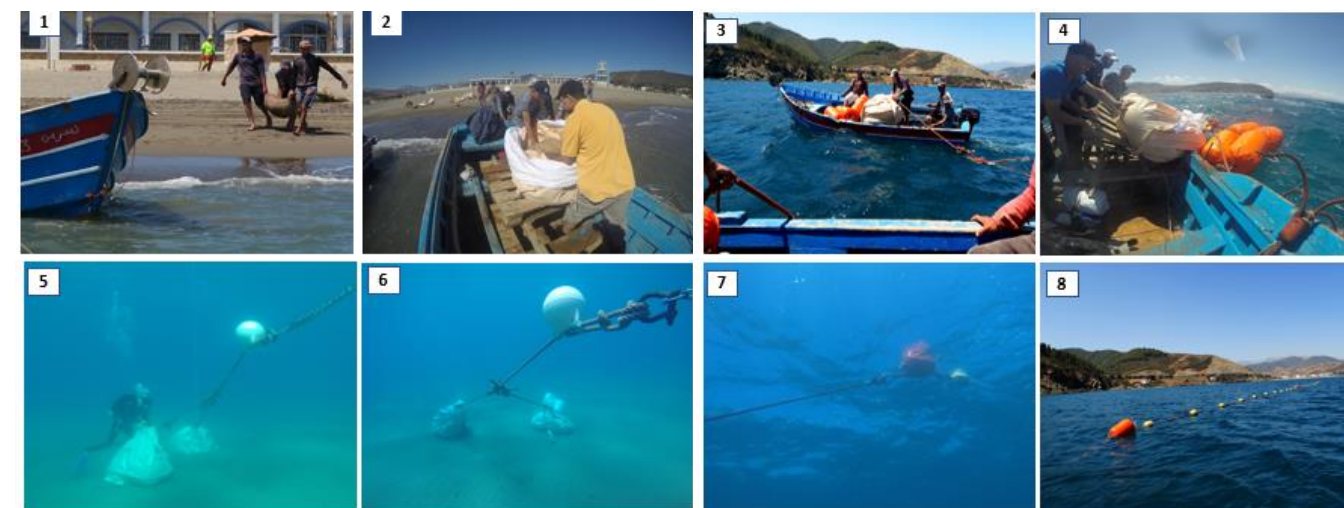
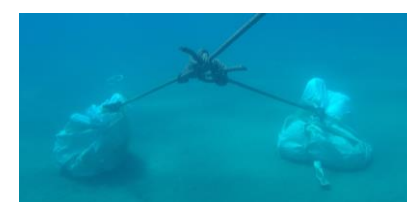


Figure 3. The steps of trasporting and installation the mooring system and differents longlines.

Behavior of the mooring system after one year:

State of mooring bags on july 2019



State of mooring bags on december 2020



Resistance of the mooring system and longlines in extreme condition :

Faced with extreme conditions (March 2020, windgru data). The different longlines/mooring system installed, have shown great flexibility and resistance (Fig. 4).

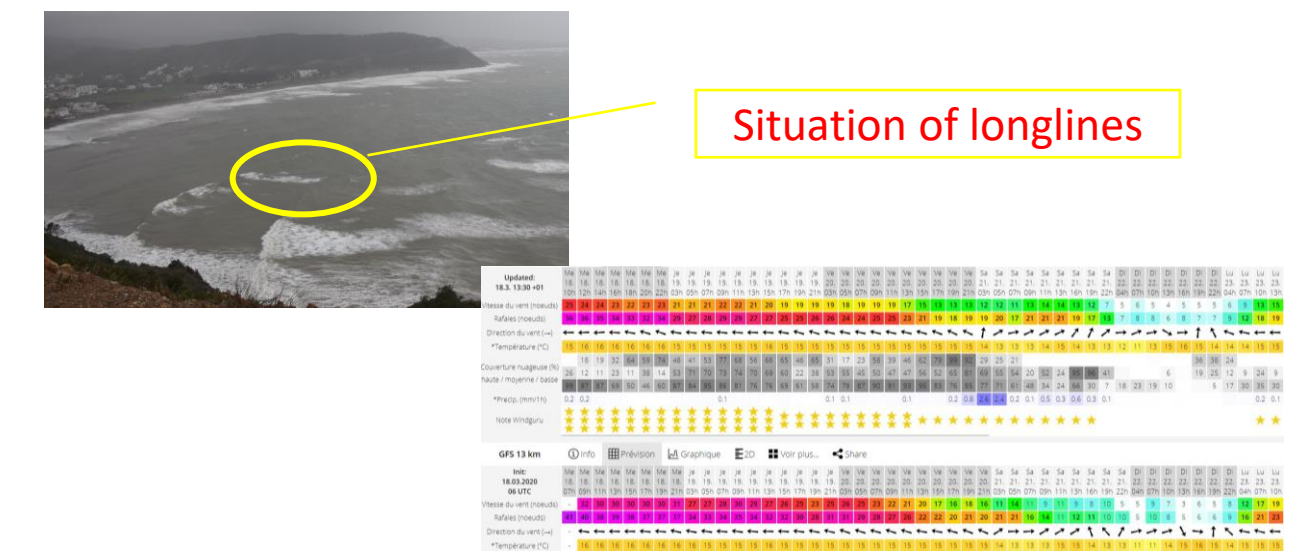


Figure 4. behavior of mmoring system/longlines faced with exterme conditions.

Conclusion

Monitoring the behavior of the longline installed since July 2019 and using gravel bags, has shown in the short and medium term, a durability and resistance of the materials used, in particular the mooring system. Indeed, no anomaly was detected (no physical destruction either the movements of the bags). However, we observed a partial burial of the bags which added more their stability.

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