



## Co-management in West African small-scale fisheries: Point zero before immersion of an artificial reef in a narrow no take area

**Bocar Sabaly BALDE<sup>1,\*</sup>, Patrice BREHMER<sup>2,3</sup>, Adama MBAYE<sup>3</sup>, Oumar SADIO<sup>2</sup>, Saliou FAYE<sup>3</sup>, Anis DIALLO<sup>3</sup>, Eric MACHU<sup>4</sup>, Alassane SARR<sup>1</sup>, Djibi THIAM<sup>5</sup> and Modou THIAW<sup>2</sup>**

<sup>1</sup>Université Cheick Anta Diop (UCAD), Institut Universitaire de Pêche et d'Aquaculture (IUPA), BP 45784 Dakar Fann, Dakar, Senegal

<sup>2</sup>Institut de Recherche pour le Développement (IRD), UMR 195 Lemar, Centre PRH, BP1386, Dakar, Senegal

<sup>3</sup>Institut Sénégalais de Recherches Agricoles (ISRA), Centre de Recherches Océanographiques de Dakar-Thiaroye (CRODT), Centre PRH, BP2241, Dakar, Senegal

<sup>4</sup>Institut de Recherche pour le Développement (IRD), UMR LOPS, BP1386, Dakar, Senegal

<sup>5</sup>Ministère de l'Economie Maritime (MEM), Direction des Pêches Maritimes (DPM), PRAO, Rue Joris, Dakar, Senegal

\*Correspondance: Tél: (+221) 77 234 63 21; Courriel: [bocarbalde2005@hotmail.com](mailto:bocarbalde2005@hotmail.com) (B.S. BALDE)

Reçu le 08/10/2015; publié le 15/05/2016

AWA © MS S5\_09

### Abstract

Within the framework of the study for the immersion of an artificial reef off Ouakam a West African small scale fishermen village (Senegal), a mission of support for the establishment of the reference situation pre-immersion of the artificial reef in a restricted fishing area (named ZIP) of the site of co-management of Ouakam, was carried out in 2015. We present here a low cost procedure where several activities were carried out with the fishermen: (1) an inspection of site was made to confirm the geographical location of the quadrangle and then we had delimited the ZIP with four main buoys and associated ones. (2) A questionnaire (30 questions) on 70 fishermen was led to collect their opinion on the implantation of the artificial reef in the ZIP. (3) A dozen of scientific fishing operations coupling pelagic sampling and demersal ones were performed to get the situation before immersion of the reef. (4) Samples were collected at the level of ZIP at three different stations (depth of 19 m, 35 m and 38 m) to identify the nature of the bottom (sediment type and benthos). (5) Finally, we deployed oxygen sensor to know the levels of dissolved oxygen in the middle of the ZIP during 28 days at 31 meters depth. Two acoustic Doppler current profilers 'ADCP' have been set in bottom station to get an estimation of the local courant in the middle of the ZIP at 29 m and 33 m (i.e. around the reef immersion site) during 20 days. As preliminary results, we observe a strong thermal and oxygen concentration amplitude in the ZIP, respectively 17 to 30 (°C) and 1.5 to 7.75 (mg/l). No fishermen attribute to climate change an effect on the decrease of their captures. They believe that the dumping of reefs can have a positive impact in the increase of captures. The results of the fishing operations show that on the surface (0-15 m); abundance ( $p = 0.02$ ) and biomass ( $p = 0.005$ ) significantly differ between sectors i.e. the values



are higher inside than outside the ZIP. The results of bottom (net: 3 m height from the bottom) fishing operations show that there are no significant differences between the inside and outside the ZIP for the abundance ( $p = 0.80$ ) and biomass ( $p = 0.27$ ). The average of Shannon's index is already (i.e. before reef immersion) higher (2.10) at the level of ZIP than outside (1.26). The results of the bottom analysis show that the bottom consists essentially of white sand, we also found some fragment of shells and of flora.



Commission Sous-Régionale des Pêches  
Sub-Regional Fisheries Commission



# International Conference ICAWA 2015

## Extended book of Abstract

**THE AWA PROJECT**  
**Ecosystem Approach**  
**to the management**  
**of fisheries and the**  
**marine environment**  
**in West African waters**

Cap-Vert

Mauritanie

Sénégal

Gambie

Guinée Bissau

Guinée

Sierra Leone

ISBN: 978-2-9553602-0-2



Bundesministerium  
für Bildung  
und Forschung



Institut de recherche  
pour le développement



Liberté • Égalité • Fraternité  
RÉPUBLIQUE FRANÇAISE  
Ministère des Affaires étrangères  
et du Développement International  
Ministère de l'Enseignement  
Supérieur et de la Recherche

Trilateral German-French-African research initiative



---

**Edited by:**

Patrice BREHMER (IRD, France; Dakar), Babacar BA (CSRP, Sub-Region; Banjul) & Gerd KRAUS (TI, Germany; Hamburg).

**Technical support:** Marie Madeleine GOMEZ (CSRP), Ndague DIOGOUL (IRD).

**With the collaboration of:**

Peter BRANDT, Bamol Ali SOW, Alban LAZAR, Xavier CAPET, Heino FOCK, Eric MACHU, Hamet Diaw DIADIHO, Didier JOUFFRE, Ibrahima DIALLO, Joern SCHMIDT, Werner EKAU, Amadou GAYE, Mahfoudhould TALEB SIDI, Modou THIAW, Cl Abdoulaye DIOP, Adama MBAYE, Dienaba Beye TRAORE, Moussa SALL, Mariline DIARA, Assane FALL, Ibrahima LY, Ivanice MONTEIRO, Vamara KONE, Aboubacar TOGUYENI, Marie BONNIN, Abdelmalek FARAJ.

---

**ISBN:** 978-2-9553602-0-2

Sub Regional Fisheries Commission / Commission Sous Régionale des Pêches ©2016

**Cover design:** AWA (BMBF – IRD) project

**Logo and flyers:** Laurent CORSINI (IRD)

**Translation:** Amadou NDIONE (independent)

---

**Sponsors ICAWA 2015:**