



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

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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.



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