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Mapping coastal aquaculture and fisheries structures by satellite imaging radar

Case study of the Lingayen Gulf, the Philippines

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FOREWORD

Cooperation between the FAO Remote Sensing Center (now Environment and Natural Resources Service (SDRN)) and the Inland Water Resources and Aquaculture Service (FIRI) began in 1983 with the joint planning of the international training course "Remote Sensing Applications to Inland Fisheries and Aquaculture", held at FAO headquarters in September 1984. Its aim was to raise awareness among fishery technical and management officers of the very positive remote sensing and GIS applications which were relevant to their work. In this framework and with the same objectives in the subsequent years training courses, pilot studies and operational projects have been jointly conducted worldwide.

A result of this longstanding cooperation has been the development and field testing, under operational conditions, of new remote sensing methodologies for specific fisheries requirements, such as aquaculture site selection, wetlands monitoring, shrimp farms inventory and monitoring and others. These methodologies have been widely disseminated to potential users in both the fields of fisheries and remote sensing through FAO publications.

The paper we present here aims to introduce a cost-effective new methodology for accurate inventory and monitoring of coastal aquaculture and fisheries structures.

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ABSTRACT

Inventory and monitoring of coastal aquaculture and fisheries structures provide important baseline data for decision-making in planning and development, including regulatory laws, environmental protection and revenue collection. Mapping these structures can be performed with good accuracy and at regular intervals by satellite remote sensing, which allows observation of vast areas, often of difficult accessibility, at a fraction of the cost of traditional surveys.

Satellite imaging radar (SAR) data are unique for this task not only for their inherent all-weather capabilities, very important as aquaculture activities mainly occur in tropical and subtropical areas, but essentially because the backscatter from the structure components allows for their identification and separation from other features.

The area selected and object of the study has been Lingayen Gulf, sited in Northwestern Luzon Island, the Philippines, where all these structures of interest occur.

Field verification of the methodology resulted in the following accuracy: fishponds 95 percent, fish pens 100 percent. Mapping accuracy for fish cages was estimated at 90 percent and for fish traps at 70 percent.

The study is based on interpretation of SAR satellite data and a detailed image analysis procedure is described. The report aims at the necessary technology transfer for an operational use of the approach indicated in other similar environments.

Keywords: Aquaculture; Fisheries structures; Geographic Information Systems; Lingayen Gulf; Philippines; Remote Sensing; SAR; Satellite imaging radar.

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