



RESEARCH ARTICLE

THE MORPHOLOGICAL CHANGES OF RIVER MOUTH ALONG THE COASTAL TRACT OF NAGAPATTINAM DISTRICT USING SATELLITE IMAGE

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ABSTRACT

The major objective of the present study is to demonstrate how remote sensing approach can be used for studying river mouth changes of Nagapattinam district. The sand particles have been removed at higher percentages with a little change, due to such unfavorable hazard like floods, storms and tsunamis. The river carries suspended sediments. The length of Nagapattinam coast line is about 187km. The satellite imagery of the years 1991, 1999, and 2008 was used for identifying the River mouth changes in the study area. ERDAS and ARC GIS software has been used for the said purpose. The river mouth is digitized along the shoreline. The major changes were noticed and brought for the changes in the study of Uppanar river, Vettar river, Vellar river. An analytical solution is derived for predicting time-variation of river mouth width under the combined influence of incoming waves and effluent river discharge.

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INTRODUCTION

Remote sensing provides inventorying, monitoring, and change detection analysis of environmental and natural resources (Narumalani *et al.* 1997). Remotely sensed images seldom replace the usual sources of information concerning water resources, they can provide valuable supplements to field data by revealing broad scale patterns not recognizable at the surface, recording changes over time, and providing data for inaccessible regions (Campbell, *et al.* 1996). The recent development in remote sensing and GIS technologies and availability of better resolution data, has revolutionized the mapping of coastal morphological changes. The excessive modification causes serious problems such as the water level rise during a floodprabaharan (*et al.* 2010). The width of the river mouth has been varied due to time variation have been studied by (Tanka *et al.*).

In Nagapattinam district, the rivers flowing that are Cauvery, Vennar and Coleron are the major rivers. The Nagapattinam district is classified into two basins 1. Cauvery basin 2. Vennarbasin.

METHODOLOGY

Changes in the coastal morphology of river mouth have been examined between standard satellite images related to different dates. Also Arc GIS software has been used to study the morphological changes by before and after classification process. In this research the Landsat images and Resource satellite images have been used for analyzing the said study area. The satellite data of different decades were stacked one over the other to interpret the morphological changes in Arc GIS. The editor tool was used by adjusting the contrast, brightness, and transparency. The swipe tool option was used. The change zones of changes were interpreted and mapped.

RESULT AND DISCUSSION

The change detection statistics for classification images average used for the compute difference map for the image (Prabaharan *et al.* 2010) In 1991, the river mouth of Uppanar was clearly showing that the area A and B (Fig.1) was not opened. The sediment approaching from the wave direction along the river mouth, the total sq.km² of that area is 0.3, it is completely closed. In the year 1999 the digitized part of A is 0.06sq.km² and B is 0.05sq.km², that was separated as A and B. The Uppanar mouth was eroded by fresh water. In the year 2008 the part A is 0.04sq.km² and B is 0.03sq.km² getting higher opening when compared to 1999 image. The migration of sand particles from the river mouth (Fig1) has increased and the presences of water bodies are high. The outward sediment migration is more from the landward side of the coastal tract.

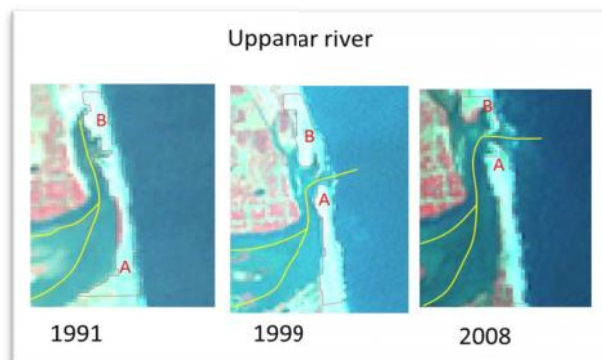


Fig. 1 The east coast of Uppanar river mouth of changes

This study reveals the Vettar river mouth in the year 1991 (A 0.04sq.km² and B 0.01 sq.km²) the mouth opening was deposited by the sand. In the year 1999, (A is 0.6sq.km² and B is 0.07sq.km²) the more freshwater approached the sand

deposit, it breaks the sand deposits, it clearly seen on (fig.2) 1999 part. The changes have taken place from 1991 to 1999 along with it. The Later Karaikal port had been constructed and was executed on January 25, 2006 (MARG Karaikal port), due to that port, the mouth of A is increased up to 0.09 sq.km² and B is 0.10 sq.km² was highly disturbed by anthropogenic activities.

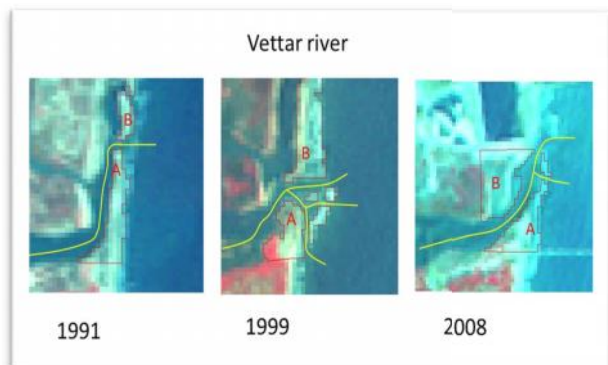


Fig. 2 The East Coast of Vettar River mouth of morphological changes

The Vellar river mouth is not a massive river mouth (fig.3) when compared to other river mouth; the morphological changes are highly varied. In the year 1991 between (the A is 0.04sq.km². and the B is 0.08sq.km².) river mouth not so highly disturbed. The outlet of fresh water gradually reduced from land. In the year 1999 (A is 0.04 sq.km². and the B is 0.06 sq.km².) migration of sand particles from the river mouth to the interior of the coastal landscape in less and the destruction water bodies have increased considerably, and in the year 2008 (A is 0.08sq.km². and B is 0.07 sq.km².) the river mouth get normal and more deposition take place on the digitized B sector.

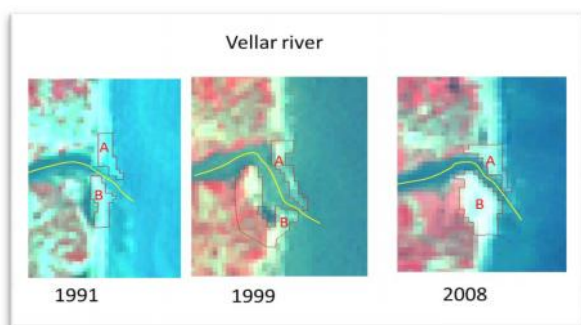


Fig 3 The East Coast of Vellar River mouth of morphological changes

CONCLUSION

The present study reveals that the characteristic of river morphological change in Uppanar river, Vettar river, and Vellar river mouth. The study carried out using multi date satellite imagery. The great quantities of sand particles were transported and shattered on the leeward side as and when the velocity decreases. Due to this reason, the river mouth has widened and decrease. Resultant of sea water has entered in to a land zone. People in this area using this land for aquaculture farms, coastal agriculture and coastal forestry are maintained. In this part of coastal region should keep in mind about this problem before rejuvenating the economic activity plans.

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