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Demarcation of coastal transition zone in Gulf of Guayaquil (Ecuador) for agriculture crops and bioaquatic hatcheries

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The Gulf of Guayaquil (Ecuador) is the largest estuary in the South American Pacific coast. It has special characteristics which make it to have a great diversity of agricultural crops and bioaquatic hatcheries.The study was focused on demarcating of Coastal Transition Zone in Gulf of Guayaquil for agriculture crops and bioaquatic hatcheries, based on salinity indexes and characterization of physicochemical properties of soils in order to establish similarities and differences between groups using multivariate analysis. In this paper, cluster analysis of 12 parameters (conductivity, pH, anions, cations, metals and organic matter) was carried on. 15 transects towards the coastline were performed, each consisting of 6 stations equidistant sampling 1 km covering a distance of 5 km from the margin of mangrove inland a total of 90 stations. The sampling points were established as a representative area because of its hydrological characteristics and tidal influence. Soils were sampled between 0 and 20 cm of depth (Topsoil). The salinity analysis was performed by the method of the saturation extract, the pH was measured with a potentiometer, chemical analysis was carried by colorimetry and atomic absorption spectrophotometry and the organic matter was determined by the method of Walkley and Black. The cluster analysis allowed to establish suitable and restrictive zones for shrimp farming and agricultural crops. It has been established that the coastal transition zone of the Gulf of Guayaquil is located at 4.2 km from the mangroves with a soil salinity of 4 mS / cm. There is a suitable zone for shrimp farming with a salinity of 13.5 mS / cm from the edge of the mangrove to 2.8 km, then the concentration of salinity prevents its use for bioaquatic hatcheries to 4.2 km. The area for agriculture crops is limited from a restricted area using a salinity value from 2mS/cm to 4 mS / cm. The characterization of the coastal transition zone using multivariate analysis established three clusters. Significant differences between groups were found by the multiple comparison of variables in Duncan test The characteristics and analysis of clusters show that cluster 1 has its own characteristics and is on the west side of the Gulf of Guayaquil. The Cluster 2 has the same characteristics that cluster 1, but it is situated at the east side of the Gulf. The Cluster 3 has significant differences with the other clusters and is situated at the entrance of the Gulf of Guayaquil on the east side.