

Sediment Transport in the Piura River. Piura, Peru.

An application with the HEC-RAS Model.

Popular Science Summary

The Piura River basin is regularly subject to flooding during the El Niño climate event. The floods not only affect the economy of the region but also communities bordering the river. The vulnerability of the basin has been influenced by changes in the flow regimen due to redirection of the river. In the past, the river discharged directly into the Pacific Ocean near Sechura. However, due to the construction of dikes, the river currently discharges into the Virrilá Estuary after passing through a series of lagoons. An observed consequence is deposition of sediment in the lower river basin which has reduced the capacity of the river during flood events. The aim of this research is the comparison of the current route through Virrilá and an alternative route towards Sechura in terms of sediment transport capacity. HEC-RAS was used for hydraulic modelling of the two routes, where output as velocity and depth was used to compare sediment transport capacity. It was found that the alternative route through Sechura features considerably larger transport capacity than the current route through Virrilá.

Increased sediment transport capacity is crucial in the Piura River to ensure sufficient capacity for the large quantities of water which pass through during heavy rainfall events. Therefore, the route through Sechura is expected to reduce vulnerability. Considering the frequent flooding of the lower basin, there are many projects and proposals to reduce vulnerability of the area. Among these are other alternative routes, construction of reservoirs, and clearing of the riverbed. River modelling is a useful tool to compare proposals in terms of sediment transport capacity or even flood vulnerability. However, a further essential aspect is data collection. Since the river is non-perennial, data can only be collected when there is sufficient flow; this makes calibration of models difficult because data from major flow events is limited. Recommendations for further data collection include flow data, land use/vegetation, and more topographic studies.

The Piura Region will continue to be affected by heavy rainfall during El Niño. It is necessary to continue investigating alternatives and collecting data for the Piura River to better understand the flow regimen and increase resilience of the area.