

THESIS
**PROBABILISTIC FLOOD RISK ANALYSIS IN CHENAB
RIVERAINE AREA IN DISTRICT MUZAFFAR GARH**



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By

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ABSTRACT

Performance of any flood protection works depends upon the correct prediction of future hydrologic events. Information on the past observed records help to derive statistical parameters based on which the future occurrences are predicted. Laws of probability help to arrive at the desired objective.

Flood risk analysis (zoning) is the corner stone of emergency management because it attempts to modify or adjust flood susceptible structures or an area on an individual or limited area basis. It is a non-structural measure for flood mitigation and essential tool for land use planning for flood prone areas. The introduction of probabilistic element enhances the capability of 'Flood Risk Zoning' because it provides the future scenario to the planners responsible for flood mitigation measures.

The study site comprises of flood prone areas of Muzaffar Garh, which are located in west of district Multan. Muzaffar Garh city is located at south of the study area. Flood in the study area causes inundation to vast areas on both banks of River Chenab. As a result cultivable lands, and human dwellings of these areas are adversely affected. But our main concern is the right bank of River Chenab along the Muzaffar Garh flood bund. In this reach, direct flood threaten areas are Manjhan Sultan, Murad Abad, Thatha Sialan and Bhutta Pur etc. Overall, any study related to safety against the floods must be considered as the integral problem of the entire society as whole, not of individuals. The protection of life and property over many years must be evaluated while comparing it with the expenditures to be involved on flood control and mitigation projects.

For the study, data have been collected for topography and the parameters required for the analysis of high flows and their spread & frequency. For the analysis data has been plotted and tabulated. Primary analysis and application of different statistical

tests reveal that highly likely Gumbel and Log Pearson III distributions would be suitable for the data available till now. Therefore, Gumble distribution was applied. The results of DFW Software for frequency analysis were found satisfactory.

In the study, it is concluded that River Ravi does not contribute to exceed the flood peaks in the Chenab, but volume. After applying statistical approach, it was also concluded that average annual flood peaks at Sher Shah were 98 % of Trimmu.

In rest of the work the results of frequency analysis i.e. floods of different magnitudes and different return periods were coupled with hydraulic parameter employing the topography of the project area for the preparation of 'flood risk mapping'. To cover the physiographical and hydraulic parameters, the use of HEC-RAS was quite result oriented.

Complete results are presented in the thesis. Flood Risk Zoning was done by following the U.S. standards. A base flood was simulated with and without encroachments on both sides of channel. A Flood Risk Zoning is only useful if it is employed and followed by Regulating / Planning Authorities and public awareness is essential to get maximum benefits. For this area the flood-fighting plan was recommended to minimize the losses.

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