a) Hazard Channel roughness (n_ch) Average flood depth (m) Upstream discharge (Q) River bed elevation (Z) River width (W) DEM resolution (DEM) Floodplain roughness (n_fp) b) Risk Total damage (million USD) Channel roughness (n_ch) Upstream discharge (Q) River bed elevation (Z) River width (W) DEM resolution (DEM) 0.5 Vulnerability (V) Exposure (X) Floodplain roughness (n_fp) 25 50 75 100 25 50 75 100 0 Percent of total variance Quantile of sample (%)