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Natural and anthropogenic hazards in the karst of Bohol, the Philippines

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About 40% of the island of Bohol is karst landscape, and karstic hazards affect much of this area, which contains about 75% of the population of 1.1 million. The inland karst consists of broad, alluviated valleys or poljes punctuated by isolated residuals (mogotes) and separated by uplands which are dissected by underdrained and abandoned dry valley systems, themselves dismembered by polygonal enclosed depressions (cockpits) and bordered by sinuous residual interfluvial ridges, which adjacent to the enclosed depressions have been reduced to isolated or connected residual hills. With population and urbanization increasing, and as infrastructure is developed, karstic hazards are becoming more prevalent and risks are increasing. One major natural hazard is seasonal drought, which disrupts water supplies, particularly in upland areas where groundwater resources are poorly developed and residents depend on rainwater and springs. Conversely, seasonal flooding, particularly that associated with tropical storms and extreme events, causes property damage and human death, injury and displacement in the valleys. Ground surface subsidence and collapse threatens developing infrastructure, dwellings and livestock, but the potential for catastrophic karstic failure appears to be limited. Slope failure also occurs, but is not often recognized as a hazard and has not been studied in detail. Human impacts include quarrying, groundwater abstraction, groundwater contamination, urbanization, agricultural development and tourism. Less than ten percent of the karst area is within protected areas and the karst is the setting for contemporary civil strife.