Using recent advances of remote sensing technologies and a numerical modeling of tsunami, the authors propose a framework in developing a method to search and detect the impact of tsunami disaster by integrating numerical modeling, remote sensing, and GIS. The structure of our method consists of several damage mapping efforts. The first phase is the regional hazard mapping. Mapping the potential tsunami hazard in regional scale is based on the numerical modeling of tsunami propagation and bathymetry/topography database. The numerical model for regional scale is based on the finite difference method of shallow-water theory. In the second phase, to identify the potential tsunami impact along the coast, the authors incorporate PTE (the Potential Tsunami Exposure as the number of population exposed against the potential tsunami hazard. PTE is obtained by the GIS analysis integrating the numerical model results and the world population database, such as LandScan. In the third phase, after the potential tsunami-affected areas are estimated, the analysis gets focused and moves on to the detection phase using remote sensing. To detect the impacted area in regional and local scales, the authors use the capability of SAR (Synthetic Aperture Radar) image analysis and interpretation of high-resolution optical satellite images, such as QuickBird, GeoEye and WorldView. The method is implemented to the 2010 Chilean earthquake tsunami to search the tsunami-affected area and detect the structural damage, using the numerical modeling and the analysis of satellite images of multi-sensors.