AN INTEGRATED OPEN-SOURCE GIS AND OBJECT-ORIENTED PROGRAMMING APPROACH FOR RAINFALL-INDUCED LANDSLIDE RISK EVALUATION IN THE PROVINCE OF AGUSAN DEL NORTE, PHILIPPINES

Mac Charles D. Agbon [a]*, Ledan Ben S. Nakila [a], Engr. Michelle V. Japitana[b]

[a] College of Engineering and Information Technology,
Caraga State University, Ampayon, Butuan City
mac.agbon@yahoo.com, +639073661393*

*[b] Faculty, College of Engineering and Information Technology,
Caraga State University, Ampayon, Butuan City
mvjapitana@carsu.edu.ph, 09157639372*

KEY WORDS: GIS, OOP, rainfall-induced landslide, risk evaluation

Abstract: This paper describes an integrated approach in rainfall induced landslide hazard zonation and risk evaluation in the province of Agusan del Norte employing open source Geographical Information System (GIS) and object-oriented programming. The main objective of this study is to integrate these two useful tools in order to develop a system that can aid in disaster risk reduction through a user interface that can be easily accessed by decision-makers and general public to promote awareness on landslide susceptibility. The slope, soil type and land use in the study area were considered as the causal factor to landslide susceptibility. Data on population per Barangay and property cost values (for agriculture lands and built-up areas) were also gathered in order to determine the risk in fatality and properties, respectively. By employing geospatial analysis in GIS platform, results showed that the top five barangays that are highly susceptible to landslide were Brgy. Lawan-lawan of Las Nieves, Brgy. Concepcion of Cabadbaran, Brgy. Simbalan and Guinabsan of Bueanavista, and Brgy. San Isidro of Santiago. In Butuan City, on the other hand, Bit-os, Pianing, Anticala and Nongnong were among the highly susceptible barangays. The Graphical User Interface (GUI) of the system was created and programmed in Visual Basic 2008 Express Edition implemented in .Net Framework 3.5. The GIS layers were displayed through the use of Map Control from Active X component of MapWindow. Hence, the developed GUI, demonstrating a methodology of coupling GIS and programming languages to provide insights to users on rainfall induced landslide susceptibility and risk evaluation, is a valuable tool for disaster risk reduction.