

# **Flood Risk Assessment and Mapping using Remote Sensing and GIS: A Case Study at Hoa Chau Commune, Hoa Vang district in Central of Vietnam**

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**Abstract:** Flood is widely considered to be the most hazardous, frequent, and widespread risk throughout the world. Especially, the Central of Vietnam where it is narrow and land strip along the coastal line and has a complex terrain sloping toward the East Sea (is commonly called in Vietnam), has suffered the most frequent influence of typhoons, tropical storms and floods. Hoa Chau commune is known as the lowland of Hoa Vang district, in the Central of Vietnam. Recently, Hoa Chau is on processing of New Rural Construction Project in period of 2011-2015. However, during the last 10 years Hoa Chau has been faced with flood disasters that caused loss of life and damaged livelihoods and infrastructure, transportation as well as the agriculture products. Therefor a flood risk map is a very valuable for the decision makers in executing the rural planning in the future.

In this study, the ALOS/PALSAR image was applied in ordered to extract the inundated areas in the historical floods of 2007. Flow direction characteristics deriving from the Aster GDEM (30m resolution) by using Hydrology tool in ArcGIS ver.10 was utilized to extract the depressed surfaces. Then the past flood experience and the flow direction were integrated to analyze and rank the potential flood hazard zones. The results were validated using land use/cover map extracting from ALOS Avnir-2 and flood depth point records from the field surveys. Demographic vulnerability was assessed based on the susceptibility to the flood hazard of the vulnerably groups including children, elders, impoverished households, and females. Finally, Flood risk was obtained by integrating the flood hazard and demographic vulnerability with a

ranking matrix in two-dimensional multiplication model.

The result shows that the flow direction and ALOS/PALSAR was integrated effectively for conducting the potential flood hazard when hydrological and metrological data are inadequate and remote sensing images taken during flood times are not available or insufficient. The flood risk analysis revealed that an area of approximately 77.04ha is under high risk, while 139.86ha and 166.05ha are under moderate and low risk, respectively. Most of the high and moderate risk areas are situated in the low lands of Hoa Chau commune (Phong Nam village, Dong Hoa village), and along the Cau Do River (Tay An village), and Vinh Dien River (Quang Chau village).

Keyword: Flood hazard, Flow direction, Demographic Vulnerability, Flood Risk, Hoa Chau commune.