

Assessment of physical mitigation provided by tree crops in the 2004 Tsunami event in West Aceh-Indonesia

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ABSTRACT

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Post-tsunami call for establishing or improving coastal protection has been quick and loud, as presence of live barriers could have reduced loss of many human lives. Coastal zone management has to provide environmental protection but also has to meet economic targets by providing sustainable livelihood options. Tree crops and in particular trees preferred by farmers contribute to both objectives. Before the Tsunami event, 40-60% of the economy of West-Aceh, Sumatra (Indonesia) depended on tree crops. The present study aims to assess and understand the physical mitigation provided by land cover, mainly tree crops, on the tsunami event of 2004 in west Aceh, Indonesia. Satellite imagery from periods before and after the Tsunami event (December 26, 2004) were used to identify zones (transects) perpendicular to the coast line, characterized by particular land-cover sequences. The emphasis is laid on the damage inflicted by the giant wave, expressed by casualties, damage to structures and run-up heights. The tools used for gathering field information on these indicators are focal groups and semi-structured interviews. Pre-conditions to develop the study include similar coastal orientation, homogeneous bathymetric features as well as distance to rivers. The distance from the epicentre is neglected due to the proximity between transects. Significant correlations amongst casualties, structural damage and run-up heights with distance to the shoreline, elevation and resistance opposed by the vegetation (green roughness) lead to the development of multiple regression models, to attempt measurement of interactions between these variables. Even though the present research is an exploratory study, the results obtained suggest supporting evidence for a possible tsunami mitigation provided by the vegetation, especially tree crops.

Keywords:

TSUNAMI, TREE CROPS, MITIGATION, REMOTE SENSING, ECOSYSTEM SERVICES, ACEH