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An Analysis of Mass Movements in Kothmale Oya Catchment

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on 07th February 2006

I certify that the work described in this thesis was carried out by me

under the supervision of

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and

Dr. C.K.M. Deheragoda – University of Sri Jayewardenepura

and a report on this has not been submitted in whole or in part to

any university or any other institution for another Degree / Diploma

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We certify that the above statement made by the candidate is true and that the work described in this thesis was carried out by this candidate under the supervision of us and this thesis is suitable for submission to the University

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ABSTRACT

Mass movements occur as gravitational forces exceed the strength of material in a slope and it is influenced by variety of factors interacting in complexity causing catastrophic disasters. There are various types of Mass Movements and they are classified using various classification schemes. One of the recognized systems of these is the "Wyoming Landslide Classification Scheme".

Sri Lanka is no exception in terms of natural disasters and the Central Highland areas were more prone to Mass Movements. The introduction of major transformations to the environment with the Accelerated Mahaweli Development has further contributed to this problem. Many studies have clearly shown that there is a significant increase of slope instabilities and Mass Movements following this significant alteration to the environment and this is especially true regarding the subtle and sensitive environment of the surrounding of the Kothmale Oya valley and its catchment area.

In order to identify the contributory and initiation factors of Mass Movements in Kothmale Oya Catchment, this study was carried out in identified 21 sites of Mass Movements in the surrounding of the Kothmale reservoir and various characteristics of each site were analyzed using field observations. Simultaneously, overall analysis of Land Use and Vegetation Dynamics was also carried out using Aerial and Satellite Remote Sensing where MFWORKS and Multispec software were used for in depth analysis.

The study reveals that the areas of Mass Movements within the Kothmale Oya Catchment can be classified in to two sets, depending on the major factors of contribution, namely Reservoir Induced Mass Movements and Rain Induced Mass Movements. These two different sets are

having unique individual characteristic features that are clearly evident during the field observations of these sites.

The construction of Kothmale Reservoir directly and indirectly made pathways to above mentioned slope instabilities. Other than this major factor many other diverse factors interact and combine in complexity to influence for the occurrence of the Mass Movements. They include: topographical factors (*presence of steep slopes*), geological factors (*presence of lineaments, anticlines and synclines*), and climatological factors (*the rain fall pattern of the region*) as the natural contributors to this process. Also number of man made factors that contribute towards the dynamics of land use and vegetation to aggravate the burden of the causation and initiation of Mass Movements in the Kothmale Oya Catchment. The impact of the man made activities such as tea and vegetable cultivation on steep slopes with inefficient drainage systems, deforestation and unauthorized resettlements in the reserve areas of the Kothmale Reservoir are also immensely contributing to the causation of Mass Movements.