UNIVERSITI TEKNOLOGI MARA

APPLICATION OF ^{137}Cs TECHNIQUE FOR STUDYING SOIL EROSION IN AGRICULTURAL FARMLAND, CAMERON HIGHLANDS, PAHANG, MALAYSIA

CHE YASMIN AMIRUDIN

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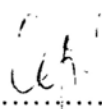**Master of Science**

Faculty of Applied Sciences

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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution for any degree or qualification.

I hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

Name of Student	:	Che Yasmin Binti Amirudin
Student I.D. No.	:	2010887972
Programme	:	Master of Science
Faculty	:	Applied Sciences
Thesis Title	:	Application of ^{137}Cs Technique for Studying Soil Erosion in Agricultural Farmland, Cameron Highlands, Pahang, Malaysia
Signature of Student	:	………………………
Date	:	January 2015

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ABSTRACT

^{137}Cs has been utilized as a marker for the study of the erosion and redistribution of soil materials. Nuclear bomb testing fallout ^{137}Cs is potentially useful as a marker of translocation of surface materials due to non-exchangeability of the cation once it comes into contact with soil particles. The soil redistribution at the sloping area become one of the top concern for planters since it will affect the fertilizers usage and may cause landslide. The study area was in eleven sloping area and a forest nearby the Bharat Tea Plantation, Cameron Highlands, Pahang, Malaysia. The area was selected in order it will provide information on the improvement of soil conditions and cost reduction of fertilizer consumption after the measurements of redistribution rate obtained. The aims of this reseacrh are to determine the erosion and deposition rate of the study areas by using environmental radionuclide applied to two conversion models, Proportional Model (PM) and Mass Balance Model (MBM) after measurements of ^{137}Cs activity concentration from the inventory. The soil profile were collected by using scrapper plate at top, center and bottom of eleven sloping areas and three undisturbed site. In every location, disturbed and undisturbed site, one core of hand auger dig was collected for soil basic parameter analysis. The ^{137}Cs activity concentration was measured using low background coaxial hyper pure germanium detector gamma spectrometer based on ^{137}Cs gamma energy peak at 661.66 keV. The selected physical properties of soil, which is bulk density, texture, organic matter content and pH were carried out the analysis. The results shows that the erosion was most occured at the top of the slope, and the depostion was almost occured at the bottom of the slope. The deposition of soil, or the soil gain proved there was a movement of erosion occured at the top of the slope and falled down to the bottom location. Results obtained by PM and MBM were found to be consistent to one another. The highest erosion rate was found at location top of Slope 6 with 62.42 t ha^{-1} yr^{-1} by using the PM and 146.41 t ha^{-1} yr^{-1} by using MBM. The lowest erosion rate was at Slope 10 top with 1.54 t ha^{-1} yr^{-1} using PM and 1.56 t ha^{-1} yr^{-1} by using the MBM. Meanwhile, the highest deposition was occured at Slope 1, center location with 216.82 t ha^{-1} yr^{-1} using the PM and 97.51 t ha^{-1} yr^{-1} by using the MBM. The lowest deposition showed at Slope 2 center location with 0.05 t ha^{-1} yr^{-1} for both models used. The results of redistribution rate in this Bharat Tea Plantation were comparable values to that study around Asia by using the conventional methods.

ACKNOWLEDGEMENTS

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