EFFECT OF LOGGING ON SOME HYDROLOGICAL PARAMETERS OF A WET ZONE FOREST CATCHMENT IN SRI LANKA

ABSTRACT

Investigations were carried out at two forest catchments in the Kanneliya-Dediyagala-Nakiyadeniya region to evaluate the effect of logging on some hydrological parameters.

One of the catchments was relatively undisturbed referred as unexploited and the other was selectively logged referred to as exploited. These two catchments are comparable in size, shape, physiography and drainage pattern. The parameters evaluated were interception, infiltration, runoff and soil erosion. The study was conducted over a period of two and a half years.

In general the study has shown that logging alters the quantity and time distribution of runoff, increases sediment yield and decreases infiltration. Logging tends to increase runoff mainly due to the reduction of interception capacity of the vegetation and the lowering of infiltration capacity of soils. With regard to time distribution of runoff the analysis of hydrographs of individual storms indicates that in logged catchments the stream-flow rates are higher than those of the control catchment during and soon after the storm. The flow in logged catchment tends to concentrate within a relatively short

period of time. The hydrographs of exploited catchment are characterised by steeper rising and falling limbs, higher peak flow rates, shorter duration of time of concentration and low delayed flow.

The study has shown that logging significantly increased sediment yield. On an average about 240 percent increase in sediment yield was observed in the logged catchment. Such an increase of sediment yield is explained in terms of peak flow rates, reduction of vegetation cover, decrease of interception, lowering of infiltration capacity, surface sealing and destruction of soil structure.

Interception studies carried out in the undisturbed catchment revealed that natural forest cover is capable of intercepting as high as 32 percent of the total rainfall. However, the investigation has also shown that interception capacity varies with the type of vegetation and the intensity and amount of rainfall.

Impact of timber harvesting on infiltration rate was well illustrated in this study. The adverse effects of logging which influenced infiltration capacity are soil compaction, removal of forest litter, and the degradation of soil through undesirable changes in structure and texture.

Further research is necessary to study the interception characteristics of forest plant species specially in terms of the various components of interception in relation to leaf and bark characteristics, girth size, and canopy structure. It is also

recommended that studies should be undertaken to evaluate runoff rainfall relationships in relation to ground water changes. Impact of logging on changes in vegetation and the associated ecological parameters should be evaluated in order to asses the impact of logging on the total environment of the forest catchment.