Lateral migration changes are very complex and complicated processes. There are consistent underlying relationships between lateral migration and other parameters such as soil erodibility, hydraulic and hydrodynamic characteristics, river bank geometry, soil properties, grain or flow resistance, planform characteristics and others. Soil erodibility plays a significant role in streambank erosion and lateral changes. It is a derivative of the physical, geochemical and biological properties and the impact of applied stresses on these derivatives is of primary concern. The controlling forces resisting hydraulic stresses generated by flowing water are a measure of soil erodibility. This study consists of two primary stages. Initially, a newly modified version of the JET device namely Jet Erosion Device (JED) is fabricated, with improved features and design that facilitates testing in the field and the laboratory. Soil erodibility coefficients are introduced to represent the erodibility of the soils under study. Field data measurements were carried out on 3 rivers where empirical models were developed using data from Selangor River and validated using data from Bernam and Lui rivers and other secondary river data. Analyses have shown high correlations and the parameters were further examined and analysed for the development of a predictive relationship for Jet index, JI using discrepancy ratio (DR) as the validation method. The second stage of this study investigates the lateral migration characteristics and the related parameters specifically focussing on soil erodibility parameter under study. Primary and secondary data was collected to obtain sufficient amount of information for variables in order to explain the controls on temporal changes of lateral migration. At this stage, Selangor River was selected for the lateral migration rates measurement. Statistical analyses were then conducted using the variables obtained through dimensional analysis to identify the relationship of lateral channel migration with the hydraulics, channel and soil erodibility characteristics. Statistical multiple regression analyses were performed to establish the empirical equation of lateral channel migration based on the selected dependent and independent variables with the incorporation of the soil erodibility parameters. Statistical parameters such as coefficient of determination, $R^2$ and root-mean-square error (RMSE) percentages were used to aid in the selection of the most appropriate model. The predictive variables selected were based on their ability to explain the variation of lateral channel migration. Once a mathematical model in a form of predictive equation was produced based on the regression of the field data, the results were interpreted and checked against any physical data. This validation process was done with field monitoring data and available secondary data. The analysis concluded that the dimensionless soil erodibility parameter obtained through the JED experiments on site is most likely show a significant relationship with lateral migration rates.

Batik Industry which is similar to Textile Industry is a popular industry in Malaysia. The industry produces wastewater that is high in color and pH, and commonly release to the nearby waterbody without any proper treatment. This practice contributed to water pollution at the nearby river. Previous studies show that color and pH are the dominant pollution in batik/textile wastewater while heavy metals are also present in the effluent. Generally, most water treatment plants utilize conventional water treatment system consists of processes such as aeration, coagulation and flocculation utilizing aluminum-based chemicals known as alum. Conventional method is insufficient to treat the batik wastewater. Therefore new treatment method is needed to overcome the problems. New recent treatment method in water purifying is the membrane technology. Membrane technology was proven to be the better solution in water supply treatment. In Malaysia, membrane technology is used in water treatment plant at Sungai Rumpit and Kepong Water Treatment Plants that utilizes the Ultra Membrane Filtration Technology. Ultra-membrane filtration technology is a new technology that does not entail the use of chemicals during the treatment process and produces clean water of higher quality than other technologies. Since membrane is made of material polymer, solvents and additive, for a greener environment, this study was carry out to substitute the chemical additives with organic additives from kenaf plants. Kenaf was selected since it is a seasonal harvesting plant that matures in 4 to 6 months. Organic additive extracted from kenaf is the kenaf core cellulose. This kenaf core cellulose replaced the commonly chemical additives in membrane fabrication. Membrane made of additive kenaf core cellulose has higher pressure resistance compare to membrane made of additive from commercially produce cellulose. A filtration system made from kenaf core cellulose nanofiltration flat sheet membrane system (IKCNFM) was fabricated for this study and filtration results were compared with other conventional wastewater treatment method such as aeration, coagulation and flocculation. Comparison was made on the wastewater quality parameter of both raw and treated wastewater using few selected system namely IKCNFM only, aeration, aeration combined with IKCNFM, coagulation and flocculation, coagulation and flocculation combined with IKCNFM. Results of the filtration wastewater quality parameter comparison show that IKCNFM was able to remove 100% of Al, Cu, Mn, Pb and Zn from the wastewater sample. Others results are SS 74%, BOD 96%, COD 92%, As 79%, Fe 80%, color 60%, pH 30% and Hg 95%. The findings indicate that all wastewater treated using IKCNFM gave better results in-comparison to the conventional methods, thus it is proven that IKCNFM has succeeded in improving the wastewater quality of batik effluent.