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Title : ENVIRONMENTALLY-EXTENDED INPUT-OUTPUT ANALYSIS IN ENVIRONMENTAL ASSESSMENT

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Sustainability has become the key goal in every aspect of the environment especially in the diverse urban systems. Sustainable practices require a controlled setting within an urban system where their practicality and efficacy could be assessed. The aim of the thesis is to establish an environmental assessment tool based on urban metabolism approach to assist decision-making during environmental and economic assessment. The outcome provides understanding on the means of integrating carbon footprint and monetary factor to oversee the expenditure of a nation in general, or a household or an individual in particular, in relation to global warming potential. This study applied a retrospective cross sectional study to provide a form of environmental assessment in developing economic-environmental input-output model for greenhouse gases emission monitoring and climate change adaptation. Methodologically, the potential impact from economic sectors' contribution on greenhouse gas emissions which eventually leads to global warming and climate change was quantitatively assessed. Firstly, the contribution of greenhouse gas emission from each economic activity was examined. Secondly, the association of greenhouse gas emissions with gross output value from each economic activity was assessed to ascertain the greenhouse gas intensity. Finally, a preliminary environmental-economic input-output tool were developed for potential global warming forecasting assessment and improving the surveillance system of each target economic sector concerning climate change. The input-output analysis method development found that

Barcelona with 14 economic sectors has carbon dioxide emission to be 24.44 kg CO₂-eq./cap/day. The method adaptation to Malaysia resulted with greenhouse gas emission of all 120 economic activities with 4.87 kg CO₂-eq./cap/day. Greenhouse gases from waste management was not captured in the input-output matrices. The waste management section was managed but the introduction to Material Flow Analysis approach which resulted with 4.5 kg/capita/ day of solid waste for Klang Valley. The economic input-output model of a nation or region is an analytical tool that describes the structure of one nation or region's economy. A derived matrix from the economic input-output table is expanded to express global warming potential which describes its total global warming impact relative to carbon dioxide emission over a set period of time. The estimation of carbon footprint from monetary fluxes is vital in the environmental health impact assessment as sustainable urban planning and sustainable economy are complimentary of one another. This study contributes to quantitatively analyse the physical input-output relationships among the socioeconomic components with the findings on the distribution of environmental impacts, thereby providing scientific model support to guide restructuring of metabolic system especially urban metabolic system. The use of publicly available data to assemble the matrix representation enables comprehensive assessment of the environmental impacts of a product or service with effective cost, in a relatively fast and high-technology manner.