

FORECASTING SOLID WASTE GENERATION IN NEGERI SEMBILAN AND MELAKA

(Peramalan Penjanaan Sisa Pepejal di Negeri Sembilan dan Melaka)

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ABSTRACT

Solid waste management is vital to ensure the cleanliness of the country and keeping the good health of the people. In Malaysia, the solid waste management system is highly dependent on landfills to manage waste. However, landfill sites in Malaysia are in dire state and constructing new landfills become impossible due to land scarcity. On top of that, the practice of recycling among the public are critically lacking which contributes to rapid increase in the volume of solid waste generated. Thus, forecasting solid waste generation is crucial to avoid overflow of waste. In this study, the solid waste produced in Negeri Sembilan and Melaka is forecasted to one year ahead and to see whether the landfills in both states are still able to accommodate the solid waste produced. Secondary data of the solid waste generated in Negeri Sembilan and Melaka from January 2017 to August 2020 is used in this study. The error measures of several univariate and ARIMA models are evaluated using the Mean Square Error (MSE) and Mean Absolute Percentage Error (MAPE) to choose the best model in forecasting the solid waste generation in both states. The results revealed that ARMA (2,2) and ARMA (3,1) is the best model to forecast the solid waste generation in Negeri Sembilan and Melaka respectively. Besides, the estimated solid waste generation for both states also is approaching the maximum landfill capacity and this issue should be taken seriously so that environmental damage can be reduced.

Keywords: solid waste management; forecasting, landfill

ABSTRAK

Pengurusan sisa pepejal sangat penting untuk memastikan kebersihan negara serta menjaga kesihatan rakyat. Di Malaysia, sistem pengurusan sisa pepejal sangat bergantung pada tapak pelupusan sampah untuk menguruskan sampah. Namun begitu, tapak pelupusan sampah di Malaysia berada dalam keadaan yang menakutkan dan pembinaan tapak pelupusan sampah baharu menjadi mustahil kerana kekurangan tanah. Di samping itu, amalan kitar semula dalam kalangan masyarakat adalah sangat kurang sehingga menyumbang kepada peningkatan cepat dalam jumlah sisa pepejal. Oleh itu, peramalan penghasilan sisa pepejal sangat penting untuk mengelakkan limpahan sisa. Dalam kajian ini, sisa pepejal yang dihasilkan di Negeri Sembilan dan Melaka diramalkan untuk satu tahun ke depan dan untuk melihat sama ada tapak pelupusan sampah di kedua-dua negeri masih dapat menampung sisa pepejal yang dihasilkan. Data sekunder mengenai sisa pepejal yang dihasilkan di Negeri Sembilan dan Melaka dari Januari 2017 hingga Ogos 2020 digunakan dalam kajian ini. Langkah ralat beberapa model univariat dan ARIMA dinilai menggunakan Min Kuasa Dua Ralat (MKDR) dan Min Peratusan Mutlak Ralat (MPMR) untuk memilih model terbaik dalam meramalkan penjanaan sisa pepejal di kedua-dua negeri. Hasil kajian menunjukkan bahawa ARMA (2,2) dan ARMA (3,1) adalah model terbaik masing-masing untuk meramalkan penjanaan sisa pepejal di Negeri Sembilan dan Melaka. Selain itu, penghasilan sisa pepejal yang dianggarkan untuk kedua-dua negeri juga menghampiri kapasiti tempat pembuangan sampah maksimum dan masalah ini harus ditangani dengan serius agar kerosakan persekitaran dapat dikurangkan.

Kata kunci: pengurusan sisa pepejal; peramalan; tapak pelupusan

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