Pengembangan Sistem Pengelolaan Sampah Plastik Daur Ulang yang Layak Secara Ekonomi di Desa Cibodas dan Desa Padamukti, Jawa Barat = Development of an Economically Viable Recycling Plastic Waste Management System in Cibodas Village and Padamukti Village, West Java

Carissa Eukairin Purnomo, author

Abstrak

Hanya 14% TPS 3R di Indonesia yang beroperasi dengan baik sehingga tingkat pengumpulan sampah masih rendah dan terjadi pencemaran sungai, salah satunya Sungai Citarik. Maka, penelitian ini bertujuan menganalisis teknologi, membuat model keuangan tiga skenario, dan merekomendasikan sistem pengelolaan sampah plastik yang minim residu dan layak secara ekonomi untuk Desa Cibodas dan Padamukti. Penelitian ini menggunakan analisis neraca massa, titik impas, model keuangan, BCR dan NPV, serta pengambilan keputusan multikriteria. Teknologi pengolahan plastik yang dipilih adalah mesin tekan hidrolik, pencacah, injeksi, dan extruder. TPS 3R pada ketiga skenario mengelola sampah dari 400 KK, namun skenario 2 ditambah plastik dari pelapak sedangkan skenario 3 ditambah plastik dari seluruh desa. Residu yang dibuang TPS 3R ke TPA adalah 93.328 kg/tahun oleh skenario 1 dan 2, serta 72.909 kg/tahun oleh skenario 3, yaitu 41%, 36%, dan 12% dari total sampah yang dikelola. Hasil pemodelan keuangan BCR 1,11; 2,13; dan 1,77 serta NPV +Rp174.741.433; +Rp2.590.917.416; dan +Rp4.687.308.967. Pengelolaan sampah yang direkomendasikan untuk diterapkan di Desa Cibodas dan Padamukti adalah skenario 2 karena sudah meminimalisir residu dan menghasilkan arus kas positif, serta dapat diimplementasikan dalam waktu dekat. Biaya iuran penerima manfaat sama dengan kondisi eksisting, namun dengan tingkat pengumpulan dan daur ulang yang meningkat.

.....The study addresses the need for financially viable community-managed sorting and recycling facilities in Indonesia, known as TPS-3R. Out of the 2,854 existing facilities, only 14% are functioning optimally due to economic challenges. To address this issue, the research aims to recommend an economically viable plastic waste management system with optimum residue and income. Cibodas and Padamukti Villages are chosen as the case study location, as it has only 20% waste collection coverage and is located in the Citarum Watershed, whose river is a source of water for 60 million people. Primary data collection was carried out through interviews with recyclers in the villages and through waste volume and composition characterization. Three scenarios were developed for the TPS-3R objectives: Scenario 1 (S1) serves as the baseline with sorting technologies, Scenario 2 (S2) includes a more advanced plastic processing facility for recyclers in the villages, and Scenario 3 (S3) optimizes waste processing to minimize residue. The waste managed in all scenarios comes from 400 households, with additional plastic for S2 from recyclers and entire villages for S3. Data analysis involved mass balance, break-even calculations, financial models, BCR, NPV, and MCDM. The residue disposed of in landfills is 41%, 36%, and 12% of the total waste managed for scenarios 1, 2, and 3, respectively. Financial modeling yielded BCR values of 1.11, 2.13, and 1.77, as well as NPV +Rp174,741,433; +Rp2,590,917,416; and +Rp4,687,308,967. Based on the findings, S2 is recommended for implementation due to its minimized residue, positive cash flow, and feasibility for swift implementation. The current TPS-3R primarily focuses on separating and selling inorganic waste, while this

study suggests purchasing separated plastic waste from recyclers and adopting shredder and injection machines to enhance economic viability while reducing residue. By maintaining the existing contribution fee, the collection and recycling rate can be increased.