Lahan basah buatan sebagai prasarana pengolah air limbah domestik di perkotaan = Constructed wetland as a domestic waste water treatment in urban area

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Abstrak

Lahan basah buatan merupakan salah satu teknologi pengolahan air limbah namun di perkotaan di Indonesia belum dimanfaatkan secara optimal. Penelitian ini menggunakan metode experimental dengan membangun lahan basah buatan skala pilot di Kelurahan Srengseng Sawah Jakarta Selatan. Tipe lahan basah buatan yang digunakan adalah Sub Surface Flow System untuk mengolah air limbah domestik jenis greywater. Aspek yang diteliti terdiri dari aspek teknis, ekonomi dan sosial selanjutnya ketiga aspek tersebut dianalisis secara komprehensif. Lahan basah buatan tersebut mempunyai volume 1,298 m3 bermedia kerikil, pasir, topsoil (dicampur kompos, pasir dan lumpur), dengan tanaman Typha latifolia.
Hasil penelitian dioperoleh kriteria penempatan lahan basah buatan pada lahan dengan kemiringan 0-2%, di lokasi permukiman penduduk dan mudah diakses. Dengan debit air limbah rata-rata 0,79 m3/hari, BOD rata-rata 205,08 mg/l dapat menerima beban organik dan beban hidrolik 283,53 kg/m2.hari dan 0,20 m3/m2.hari. Laju degradasi BOD dan COD sebesar 0,76/hari dan 0,73/hari maka waktu tinggal dalam lahan basah buatan 1,6 hari dan pencemar dapat diturunkan sampai di bawah baku mutu. Melalui penilaian kelayakan ekonomi dengan penetapan periode kegiatan selama 10 tahun, didapat NPV sebesar Rp 36.780.465,- dengan B/C rasio 1,5. Dengan memasukkan manfaat lingkungan maka pengoperasian lahan basah secara ekonomi dinyatakan layak.
Persepsi masyarakat terhadap pemanfaatan lahan basah buatan menurut Skala Likert 3,59- 4,10 (pada skala 1-5) dengan Indeks Partisipasi Masyarakat 0,6-0,8 (pada skala 0- 1). Persepsi masyarakat terhadap kinerja lahan basah buatan 1,88-2,81 dan persepsi masyarakat terhadap nilai kepentingan lahan basah buatan 3,03-3,54 (pada skala 1-4). Penerimaan masyarakat diekspresikan dari persepsi positif terhadap kepentingan penerapan lahan basah buatan.
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Constructed wetland is one of the wastewater treatment technologies, but their utilization in urban areas have not been optimized. The study using experimental methods, that has built a pilot scale constructed wetland at Kelurahan Srengseng Sawah, South Jakarta. The constructed wetland type used was Sub Surface Flow system for treating of greywater domestic wastewater. The aspect of study consists of ecotechnology, economic and social further the relationship between aspects comprehensively analyzed. The constructed wetland has a volume of 1.298 m3 with media was consist of gravel, sand, topsoil (mixture of compost, sand and clay) and plant of Typha latifolia.
Results are study as follows, placement criteria constructed wetlands on land with a slope of 0-2%, available land that can be utilized, close to settlements and accessible. With of discharge of waste water 0.79 m3/day, BOD average 205.08 mg/l, the organic loading rate dan the hydraulic loading rate 283.53 kg/ha.day and 0.20 m3/m2.day. While the degradation rate of BOD and COD were 0.76/day and 0.73/day the retention time was 1.6 day respectively and the pollutants can be reduced to below the standard. Economic criteria, through the assessment of the economic feasibility of the determination of the period of activity for the past 10 years,

the NPV of Rp 36,780,465,- the B/C ratio of 1.5. By adding the value of the environmental benefits that constructed wetlands are economically profitable.

The public perception of value from 3.59 to 4.10 (at 1-5 scale) according to the Likert Scale and Community Participation Index from 0.6 to 0.8 (at 0-1 scale). Perception of the performance of constructed wetlands from 1.88 to 2.81 and from 3.03 to 3.54 (at 1-4 scale) for value of importance constructed wetlands. Acceptance of the community expressed through a positive perception of the interests of the application of constructed wetland.