

ANALISIS ENERGI MASUKAN-KELUARAN PADA PROSES PRODUKSI KELAPA SAWIT (*Elaeis guineensis* jacq.)

Input-Output Energy Analysis in Oil Palm Production

Agus Haryanto¹, Budianto Lanya¹, Sugeng Triyono¹, Mirwan Saputra², Nomi Setyowati²

¹Program Studi Teknik Pertanian, Fakultas Pertanian, Universitas Lampung, Jl. Sumantri Brojonegoro, No. 1, Bandar Lampung 35145; ²Alumni Program Studi Teknik Pertanian, Fakultas Pertanian, Universitas Lampung.

Email: agusharyanto@unila.ac.id

ABSTRAK

Penelitian ini bertujuan untuk menganalisis energi masukan-keluaran dan mengidentifikasi kemungkinan penghematan energi pada proses budidaya kelapa sawit. Penelitian dilakukan di PTPN VII Unit Usaha Rejosari, Lampung Selatan dengan mengamati semua energi yang digunakan dan dihasilkan. Energi masukan terdiri dari tenaga manusia, bahan bakar, energi tidak langsung dari pupuk, pestisida, dan alat-mesin pertanian. Energi keluaran berasal dari tandan buah segar (TBS) dengan komponen minyak sawit, minyak inti sawit, serat, cangkang, dan tandan kosong, serta pelepah. Hasil penelitian menunjukkan bahwa budidaya kelapa sawit memerlukan energi masukan sebesar 57,63 GJ.ha⁻¹ dan menghasilkan energi 339,14 GJ.ha⁻¹. Sebagian besar energi masukan adalah penggunaan pupuk yang mencapai 31,22 GJ.ha⁻¹ (54,18 % dari total energi masukan). Berdasarkan tahapan budidaya, maka pemeliharaan tanaman produktif memerlukan energi yang paling besar yaitu 33,06 GJ.ha⁻¹ (57,37 %). Budidaya kelapa sawit menghasilkan energi neto 281,51 GJ.ha⁻¹ dengan rasio energi 5,88, produktivitas energi 0,258 kg TBS/MJ, dan intensitas energi 3,87 MJ/kg TBS.

Kata kunci: Analisis energi, energi masukan, energi keluaran, indikator energi

ABSTRACT

This study was performed to evaluate the input-output energy for oil palm production and to identify the possibility to save energy consumption for activities related to oil palm production. Observation was conducted at PTPN VII Farm Unit of Rejosari, South Lampung. The energy inputs included human power, fuel and electricity as well as indirect energy resulted from the use of farm machinery, fertilizer, and pesticide. Energy outputs to be considered were resulted from full fruit bunch (FFB) consisted of crude palm oil (CPO), palm kernel oil (PKO), fiber, shell, empty fruit bunch, and trunk. The study revealed that total energy input of 57,63 GJ.ha⁻¹ was required in oil palm production. Maintenance of productive plant consumed the highest energy, that was 33,06 GJ.ha⁻¹ or 57,37 % of the total energy input. Based on energy sources, fertilizer was the most important input for oil palm production, accounted for 31,22 GJ.ha⁻¹ (54,18 % of total energy input). The study also concluded that oil palm production generated energy output of 339,14 GJ.ha⁻¹ with energy ratio of 5,88, energy productivity of 0.258 kg FFB per MJ, energy intensity of 3,87 MJ per kg FFB, and net energy gain of 281,51 GJ.ha⁻¹.

Keywords: Energy analysis, input energy, output energy, energy indicators