

Energy utilization in major crop cultivation

ABSTRACT

A total of 42 crops were categorized into eleven Indicative Crop Classification (ICC) in accordance to the Food and Agriculture Organization (FAO) as cereal, vegetables, fruit, nut, oilseed crops, root/tuber crops, beverage and spice crops, sugar crops, leguminous crops, fiber crops and Tobacco for the study of energy utilization in their productions. The energy utilization in the production of these selected crops was taken from the literature studies that were conducted from the collection of 120 published journal articles from 2004 to 2017. Among the eleven crop classifications, the energy input for vegetable and melon crops was the highest (73.425 GJ/ha) while energy input for leguminous crops was the lowest (6.13 GJ/ha). Electricity, fertilizer and diesel are the major sources of energy they contributed by 46%, 20% and 14% respectively. The electricity was mostly for the water pumps that were used for pumping of water for the crops in the field. Direct energy contributed by 39.35% of the total energy consumed while indirect energy contributed 45.19%. Renewable energy represented 17% of total energy used while non-renewable energy represented 83%. For cereal crops, fertilizer energy contributed the highest value in the energy input with a value of 617080.0 MJ/ha or 27% of the total input, direct energy contributed 57% of the total energy input and indirect energy is 43% of the total energy, while renewable and nonrenewable energy shared by 19% and 81% of the total energy input, respectively. On the other hand, the average mechanization index level for all crop classifications was calculated to be 0.52, and these indexes varied from 0.18 for spice crops to 0.77 for cereals crops with corn scoring the highest mechanization index of 0.90 while rice has the lowest index of 0.61. Tobacco has the lowest value of the energy ratio by 0.10 while coconut has the highest value of 29.4. Finally, in energy productivity, watermelon has the highest value of 1.7 kg/MJ while tobacco has the lowest value of 0.03 kg/MJ.

Keyword: Energy analysis; Energy ratio; Energy productivity; Mechanization index

