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“Prosperity and Poverty in a Globalised World—
Challenges for Agricultural Research”

Design of a Row Crop Weeder

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Abstract

The operations involved in the crop production cycle include land clearing, land forming/land leveling, tillage, and crop establishment, harvesting and post harvest operations. Crop establishment is necessary to eliminate the effect of weeds, pests and disease infestation and to provide suitable conditions for optimum yield. More than 3000 species of weeds had been identified all over the world. The cost of weed management is enormous, however the opportunity cost of weed management is higher. Weed control measures must be put in place to check the growth and propagation of weeds. Chemical and manual weed control methods are viable alternatives; however, whereas environmental impact of herbicides made chemical method unsustainable, drudgery limits the size of farm of an individual in sub-Saharan Africa. Introduction of an effective mechanical weeder is expected to encourage subsistent farmers leading to increased production and hence reducing poverty. To achieve this objective, a row crop weeder was developed in the Federal University of Technology, Akure in Nigeria. The weeder was designed, fabricated and tested and found to be very efficient. The machine consists of an abrasive nail-brush mounted on a shaft, transmission system, 5Hp engine, frame and wheels. The height of cut of the machine is adjustable, thus the machine operates as a mower when cutting height is 2 cm to 4 cm above the ground level, but works effectively as a weeder between —2 cm to 1 cm. The machine is simple, cost effective and useful for small to medium scale farm holders. It is also a positive step towards reduction of drudgery involved in row crop weeding. Zero tillage, conventional tillage (with plough and harrow) and other cultural tillage practices that would present crops on the flat are well suited for the adoption of this machine. The cost the prototype machine was estimated at 500 US Dollars (N 65,000.00). However the cost of the commercial model was estimated at 300 US Dollars (N39, 000.00). The machine is economically viable with fuel consumption limited to 8 litres per day.

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