ENERGY REQUIREMENT AND ECONOMIC ANALYSIS OF SUGARCANE PRODUCTION IN DERA ISMAIL KHAN DISTRICT OF PAKISTAN

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ABSTRACT

This study examines energy use pattern and their relationship between energy inputs and yield for sugarcane production in Dera Ismail Khan District of Pakistan. The data used in this study were based on cross-sectional data collected from growers by using face-to-face interviews. The results revealed that fertilizer and pumping operation (electricity/diesel) consumed the bulk of energy. In the surveyed farms, in the case of ratoon crop, average yield and energy consumption was calculated as around 38 tonnes and 4003 kWh per hectare on Bullock Operated Farms (BOF) and 52 tonnes and 5564 kWh per hectare on Tractor Operated Farms (TOF). Whereas, in the case of planted sugarcane crop, the yield and energy consumption was 38 tonnes, 11100 kWh on BOF, 44 tonnes, and 13680 kWh respectively. The results also showed that energy efficiency i.e. output-input ratio was higher on ratoon sugarcane crop (15.67 and 15.43) as compared to planted sugarcane crop (5.67 and 5.31) on BOF and TOF respectively. Cost of production remained low on BOF than TOF, however, the yield and consequently crop values and gross margin were higher on TOF than BOF. Per hour return to family labour after paying all expenses on BOF was only Rs 4 per hour compared to Rs 8 on TOF in sugarcane ratoon crops, however, this difference was low in case of sugarcane planted crop. In this crop, per hour return was Rs. 0.78 on BOF and Rs. 1.44 on TOF.

INTRODUCTION

The agriculture sector is not the largest energy-consuming sector of Pakistan (Pakistan Energy Yearbook, 2006). However, since agricultural production has many energy consuming operations such as tillage, interculture, irrigation, application of fertilizers and other chemicals for plant protection, harvesting, transportation etc. agriculture consumes a fair amount of energy. At this stage agriculture in Pakistan is in transition from the traditional i.e. low energy inputs methods of farming to agricultural production methods using higher level of energy inputs, to cope the food requirements of the country's' population growing at a rate of almost 3% (Economic survey of Pakistan, 2005-06).

Mandel *et al.* (2002) understands that increase in mechanization level of operation for comparatively higher crop production increases the energy consumption. Similarly, Khan and Singh (1997) observed increase in cropping intensity with increase of energy level of the farms in Pakistan.

Although energy consumption is increasing with time, it has also been observed that the energy use efficiency is declining constantly (Khan & Khan, 2007). Furthermore, in order to sustain agricultural production, effective energy use is required, since it provide ultimate financial saving, preservation of fossil resources and reduction of environment distortion (Demircan *et al.*, 2006). To formulate a policy to increase the use of commercial energy, it is imperative to examine the pattern of present situation of energy consumption for agricultural production.

Sugarcane is an important crop of Pakistan. Among the top ten producing countries of the world, Pakistan occupies the 4th place. On the other hand, average yield of the crop is second from the lowest in the list (FAO, 2005). Efforts are immediately required to look into the matter of these downfalls.

Numerous researches have been conducted on energy and economic analysis to determine the energy efficiency of different crop production practices in the developed countries as well as in the neighbour country (India). However, very few have been published on energy and economic analysis of sugarcane crop and especially with