ABSTRACT

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Farm mechanization has been recently promoted in Nepal as a key technological intervention to reduce cost of production, improve farm resource efficiency and address labor shortage issue in agriculture and thereby increase productivity and return to factor of production in rice farms. A research was carried out to investigate the economics of farm mechanization for rice production in Terai region of Nepal. The major objectives of the research were to assess the profitability ratio of traditional and mechanized rice farms; to explore factors affecting adoption of mechanization; and to assess resource use and technical efficiency of traditional and mechanized rice farms. A multistage sampling technique was used to collect the cross-sectional data from 494 respondents covering 274 mechanized and 220 traditional rice farms/farmers from Jhapa, Sunsari and Bardiya districts of Terai region during 2018/19. Descriptive statistics, logistic regression, discounting method of investment analysis and Cobb-Douglas production frontier models were employed to analyze the data using MS excel, SPSS and STATA software. Labor required per hectare of the mechanized rice farms was 72.7 person days, which was significantly lower than 141.6 person days from the traditional rice farms. Mechanized farming saved 46.80% proportion of labor cost and 24.80% of variable cost as compared to traditional farming. Number of the bullocks used per hectare in traditional rice farms was four time higher than in mechanized farms. Mechanized rice farms were found to use farm machines at an average of 14 hours/ha. The t-test showed the significant difference in cost of production in mechanized (NRs. 85,434.6/ha) and traditional rice farms (NRs. 95,993.6/ha). Significantly higher B/C ratio was found in mechanized rice farms (1.32) as compared to traditional rice farms (1.06). The research showed that the variable cost saved in mechanized farms in comparison to traditional ones was 24.80 % and was significant.The average technical efficiency of mechanized and traditional rice farms were found 80.56% and 70.11%, respectively. The scope of increasing output (yield) in mechanized and traditional rice farms was found by 19.44% and 29.89%, respectively. Similarly, return to scale in mechanized and traditional rice farms were found 0.695 and 0.488, respectively. The machinery cost was the most significant factor to contribute to total income in mechanized rice farms, whereas the fertilizers cost contributed the most in case of traditional rice farms. Effect of manures, fertilizers and bio- and chemical pesticides was positive and significant in both types of farms. Chemical fertilizers, machineries, chemical and bio-pesticides and irrigations were identified as under-utilized resources. Hence, these inputs were required to be used more, and while human labor, seed and animal labor were over used and were required to be used less. Benefit-cost ratio of reaper (2.89) and power tiller (2.32) was higher than transplanter (1.61). The investment on reaper and power tiller appeared to be profitable because of their higher benefit cost ratio and internal rate of return, and lower discounted payback period. The critical factors influencing the adoption of farm

mechanization in rice cultivation were education, access to machines, farm size, availability of own machines, number of members migrated from households, labor wage rate, credit facility and subsidy in farm machines. The major constraints to the promotion of farm mechanization in rice production were higher cost of machineries and inadequate training in repair and maintenance services. The study suggested to ensure adequate availability and optimum use of inputs including appropriate farm machines and investment in irrigation infrastructures, need of appropriate policy reforms in subsidy scheme in farm machines and modified custom hiring services to promote farm mechanization in Terai region of Nepal.