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Sustainability of mechanisation service economy in assam: evaluating custom hiring centres (CHCs) and private service providers (PSPs)

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Abstract

Farm mechanisation is vital for enhancing agricultural productivity and meeting rising food demands in India. However, Assam lags behind the national average in farm machinery use. To address this, 46 Custom Hiring Centres (CHCs) have been set up under the Assam Agri-business and Rural Transformation Project (APART) to boost mechanisation and farm power in the state. These CHCs comprise a set of farm machinery, implements and equipment available for farmers to rent at affordable rates. This study evaluates the sustainability of CHCs and individual machinery owners through economic analysis including payback period, internal rate of return (IRR) and break-even point (BEP) compared to traditional methods (manual transplanting/broadcasting, weeding, harvesting, etc.). Findings reveal that the higher net profit (39 USD/ha) was obtained with combine harvester, followed by transplanter (29 USD/ha), reaper harvester (18 USD/ha), seed drill (16 USD/ha), drum seeder (11 USD/ha) and axial flow thresher (10 USD/ha). Similarly, the portable rice mill and dry grinding machine exhibited a net profit of 3 USD/t and 0.1 USD/hr, respectively. Based on net profit, the payback period and IRR were calculated for all machines. The drum seeder had the shortest payback period (0.4 years) and the highest IRR (250.1), while the combine harvester had the longest payback period (3.5 years) and the lowest IRR (13.2). But of all machines in the CHC, the dry grinding machine, running mostly on hourly basis, had a BEP of 1002.7 hrs. Similarly, the BEP of a portable rice mill running on a tonnage basis was 154.3 t. In terms of capital returns, the combine harvester takes long time, whereas less time is required for drum seeder, reaper harvester, axial flow thresher and seed-cum-fertiliser drill. Reaper harvesters are widely adopted for crops like rice and mustard, creating business opportunities for young farmers and reducing agricultural labour migration. With the endorsed hiring rates and parameters, CHCs are currently functioning to provide a significant inclusive profit, especially with mini combine harvester, reaper harvester, and axial flow thresher as compared to other machines. Farm

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mechanisation presents strong start-up potential, with further lowering cultivation costs and benefiting small and marginal farmers.

Keywords: Custom hiring centre, economic analysis, energy input, farm mechanisation, reaper harvester, rice production