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Climate -resilience dairy in Asia: Implications for economic and environmental sustainability

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Abstract

The ongoing climate change and economic uncertainty across the globe are considered as tremendous challenges for meeting future demand of consumers for milk and milk products and ensuring food security in Asia. Therefore, the objective of this study was to quantify economic and environmental sustainability for developing a data-driven monitoring system for climate resilient production system in Asia. This study utilises the International Farm Comparison Network (IFCN) Typical Farm Database from 174 farms from 58 countries which were the extracted only for Asia (37 typical farms from 9 Asian Countries) consisting of three from Middle east (Turkey, Iran and Israel; three from South Asia (India, Pakistan, Bangladesh) and three from South east Asia (Indonesia, Japan and China). The sustainability criteria were adopted from Dairy Sustainability Framework (DSF) and IFCN sustainability Metrics. The Cost of milk production only (COMPO) and milk price represent the Economic Sustainability and Carbon Footprint (kg CO₂e/kg Solid Corrected Milk -SCM) represent Environmental sustainability. As regards farm resilience (buffer capacity to withstand and/or bounce back from sudden or acute shock) which includes Liquidity (measure the cash flow higher than cash expenses), Financial Profit Margin (measure the efficiency of the dairy enterprise) and Operating Profit Margin (measure as the ability to cover all opportunity costs) were used for the farm resilient factors. The results revealed that Turkey is economically Sustainable as the COMPO for Turkey is the lowest among all Asian Counties (18.8 USD/100 kg SCM). The highest milk price for Iran (75.43 USD/100 kg SCM) clearly showed highly sustainable while the lowest milk price is observed for Bangladesh (44.46 USD/100 kg SCM). The carbon footprint was found the lowest for Japan (0.91 kg CO₂e/kg SCM) and the highest was found for Bangladesh (2.90 kg CO₂e/kg SCM) which implies that Bangladesh is the least climate resilient compared with other Asian Countries. Considering the farm resilience criteria, all South Asian countries fall under risk to cope with shocks. The results of this study are highly beneficial for dairy farm monitoring system to make the sustainable in the era of extreme climate resilient dairy production in Asia.

Keywords: Carbon footprint, climate resilience, dairy farming, IFCN, sustainability