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Bridging the fodder gap: Holistic approaches for resilient dairy farming in Pakistan

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Abstract

Fodder scarcity remains a significant constraint to dairy productivity in Pakistan, particularly during the climatic extremes of summer and winter. This study investigates existing feeding practices and evaluates the impact of seasonal fodder shortages on dairy farms in Sargodha, 11th largest city in Pakistan and a significant milk-producing region in Punjab to propose strategies for resilience and sustainability. Using a semi-structured pretested questionnaire, interviews with semi-commercial small-scale (SCSS), commercial small-scale (CSS) and commercial large-scale (CLS) peri-urban dairy households (HH, 40 per type) were conducted in July–August 2024, using snow-ball sampling.

Findings revealed 60 % of all farms faced fodder shortages during peak summer ($>50^{\circ}\text{C}$) and winter (0°C). SCSS farms were most affected (88.6 %), compared to CSS (34.3 %) and CLS (0 %). Average numbers of milking animals were 10 ± 3.7 (SCSS), 12 ± 7.1 (CSS), and 110 ± 321.4 (CLS). Silage usage was reported on 65.7 % of farms, differing significantly among farm types ($p < 0.01$): 7 % (SCSS), 80 % (CSS), and 98 % (CLS). Other feed sources during scarcity included dry fodder (SCSS 66 %, CSS 23 %, CLS 0 %), concentrates (SCSS 14 %, CSS 6 %, CLS 2 %), and use of non-conventional feed resources were significantly ($p < 0.05$) different and was highest on SCSS 97 %. Corresponding milk yield reductions during scarcity were greatest on SCSS (22.0 %), followed by CSS (11.6 %), and lowest on CLS (2.6 %). About 93.3 % of farms cultivated their own fodder, while 43.8 % also grew alternative crops like millet and sorghum. Group-Comparison analyses revealed strong correlations between higher silage use, diversified fodder cultivation, and shorter fodder scarcity periods.

SCSS dairy farms, based on traditional feeding, suffered most economic and production losses since they did not have resilience strategies such as biosecurity, sanitation, and climate-resilient feeding. CSS and CLS farms, however, were more resilient through the implementation of innovative methods such as organised silage utilisation, well-designed diets, and improved housing to mitigate heat stress. The study underscores the extreme necessity of certain interventions on SCSS farms such as facilities for heat stress relief, promoting substitute fodder crops, and training in silage production. Increased smallholder adaptive capacity is of paramount importance to offer resilient and sustainable dairy production under poor resource conditions.

Keywords: Adoption, climate-stress, peri-urban, resilience, silage, smallholder

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