**Resilience to Extreme Heat in Milk Production: Evidence from Israel**

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**Abstract**

The impacts of climatic variability and change on agriculture - including the dairy sector - can have dramatic local and global effects on incomes, nutrition and food security. Dairy science has long recognized the sensitivity of milk production to heat stress, but rigorous economic assessments of the potential impact of climatic variability and change at country level scales remain strikingly absent from the climate impacts literature. Existing studies often make strong functional form assumptions regarding the response to variations in temperature (e.g., linearity) that are often based on highly localized estimates from limited samples of farms. Moreover, they do not take into account either short- or long-term adaptive responses by farmers.

This research attempts to fill this gap by exploiting extensive high resolution data sets on milk production in Israel (daily data at the cow level spanning some 30 million records per year), augmented by data on coping strategies used by Israeli dairy farms that we collected in a survey of about 300 farms. Our analysis builds on and adapts methodological advances, introduced in recent years by environmental and agricultural economists to the climate impacts literature, that have so far not been applied to the dairy sector.

We provide novel economic estimates of: (i) the effects of temperature and humidity on milk production at a much higher level of flexibility and precision than was previously analysed; and (ii) the benefits and costs of different potential adaptation strategies. We also use the unique resolution of the data to make methodological contributions such as testing important assumptions about the additive linear properties of estimates in the weather-economics literature.