

INTISARI

PENDEKATAN MODEL VARX UNTUK MENGANALISIS HUBUNGAN ANTARA VARIABILITAS IKLIM DAN PRODUKSI PETERNAKAN DI INDONESIA

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Penelitian ini memanfaatkan model VARX (*Vector Autoregressive with Exogenous Variables*) untuk menganalisis hubungan antara variabilitas iklim dan produksi peternakan di Indonesia. Data sekunder tahunan (1970–2020) mencakup populasi sapi dan kambing serta variabel iklim eksogen (suhu maksimum, suhu minimum, intensitas hujan tinggi – “tahun basah”, dan intensitas hujan rendah – “tahun kering”). Estimasi model VARX menunjukkan bahwa produksi peternakan sangat dipengaruhi oleh nilai produksi tahun sebelumnya (efek autoregresif yang signifikan). Perluasan lahan pertanian berpengaruh negatif terhadap produksi sapi (melalui berkurangnya lahan penggembalaan), tetapi tidak signifikan terhadap produksi kambing. Peningkatan suhu maksimum terbukti menurunkan produksi sapi dan kambing secara signifikan, sedangkan kenaikan suhu minimum justru meningkatkan produksi keduanya (karena mengurangi stres akibat cuaca dingin). Tahun basah secara signifikan menurunkan produksi sapi, sementara tahun kering meningkatkan produksi kambing (menunjukkan ketahanan kambing terhadap kondisi kering). Model menjelaskan lebih dari 90% variasi produksi sapi dan kambing (nilai R^2 tinggi), menandakan kecocokan model yang baik. Temuan memberikan dasar empiris bagi kebijakan adaptasi iklim di subsektor peternakan Indonesia, seperti pengembangan sistem pendingin kandang, diversifikasi ternak, hingga perencanaan asuransi ternak.

Kata Kunci: model VARX, variabilitas iklim, produksi peternakan, sapi, kambing.

ABSTRACT

A VARX MODEL APPROACH TO ANALYZING THE RELATIONSHIP BETWEEN CLIMATE VARIABILITY AND LIVESTOCK PRODUCTION IN INDONESIA

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This study employs the VARX (Vector Autoregressive with Exogenous Variables) model to analyze the relationship between climate variability and livestock production in Indonesia. Annual secondary data (1970–2020) include cattle and goat populations as well as exogenous climate variables (maximum temperature, minimum temperature, high precipitation intensity – “wet years”, and low precipitation intensity – “dry years”). The VARX estimation results indicate that livestock production is significantly affected by its past values (a significant autoregressive effect). Agricultural land expansion negatively affects cattle production (through the reduction of grazing land), but it is not substantial for goat production. Increases in maximum temperature proved to significantly reduce cattle and goat production, whereas increases in minimum temperature instead enhance their production (by reducing stress from cold weather). Wet years significantly decrease cattle production, while dry years increase goat production (reflecting goats’ resilience to dry conditions). The model explains more than 90% of the variation in cattle and goat production (high R^2), indicating a good model fit. These findings provide an empirical foundation for climate adaptation policies in Indonesia’s livestock subsector, such as the development of barn cooling systems, livestock diversification, and livestock insurance planning.

Keyword: VARX model, climate variability, livestock production, cattle, goats.