# Response to Multiple Choice Question

## Analysis of Regression Prediction for Farm Population in 2050

The correct answer is (C) Neither method is appropriate for making a prediction for the year 2050 based on these data.

### Justification:

The regression equation was developed using data from 1910 to 2000, which represents the range of years within which the model has been validated. The year 2050 falls 50 years outside this range, making it a substantial extrapolation beyond the domain of the original data.

Statistical principles caution against extrapolating regression models far beyond the range of the predictor variables for several reasons:

1. \*\*Assumption of Linearity\*\*: The linear relationship observed between 1910-2000 may not continue beyond this period. Farm population decline could plateau, accelerate, or follow a completely different pattern after 2000.

2. \*\*Changing Conditions\*\*: Socioeconomic factors, agricultural technology, and policy changes affecting farm populations in 2050 may be fundamentally different from those during the model's time frame.

3. \*\*Increasing Uncertainty\*\*: Prediction uncertainty grows substantially as we move away from the data range, making extrapolated predictions increasingly unreliable.

4. \*\*Potential Logical Inconsistencies\*\*: Mechanical application of the equation yields: 1167 - 0.59(2050) = -42.5 million people, which is impossible since population cannot be negative.

While both methods (A) and (B) would yield the same numerical prediction, neither is statistically sound practice for a prediction so far beyond the data range. The proper approach would be to either collect more recent data to update the model or acknowledge the severe limitations of such long-range forecasting.