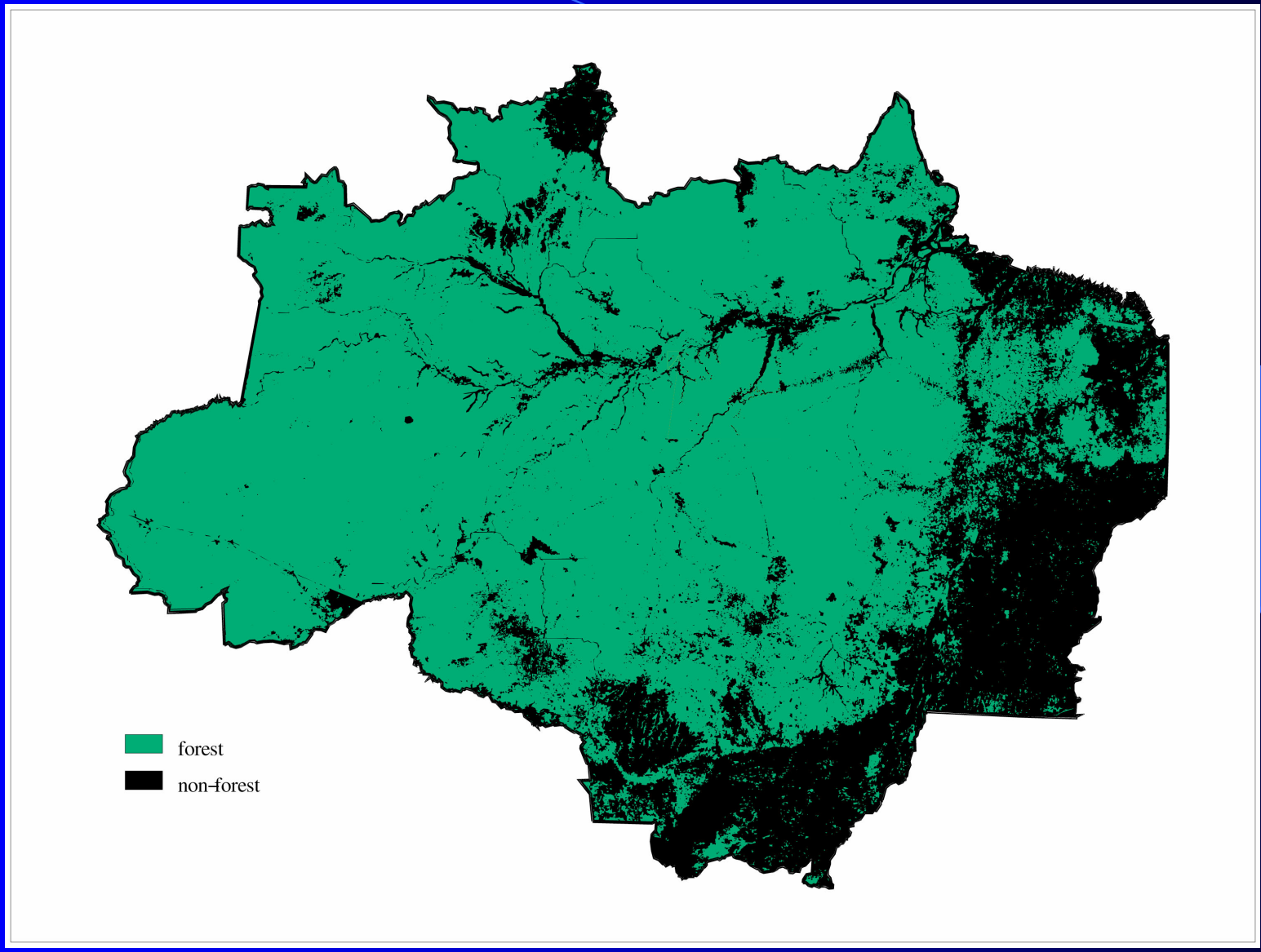
Current Deforestation (1999)



Ordination Axes

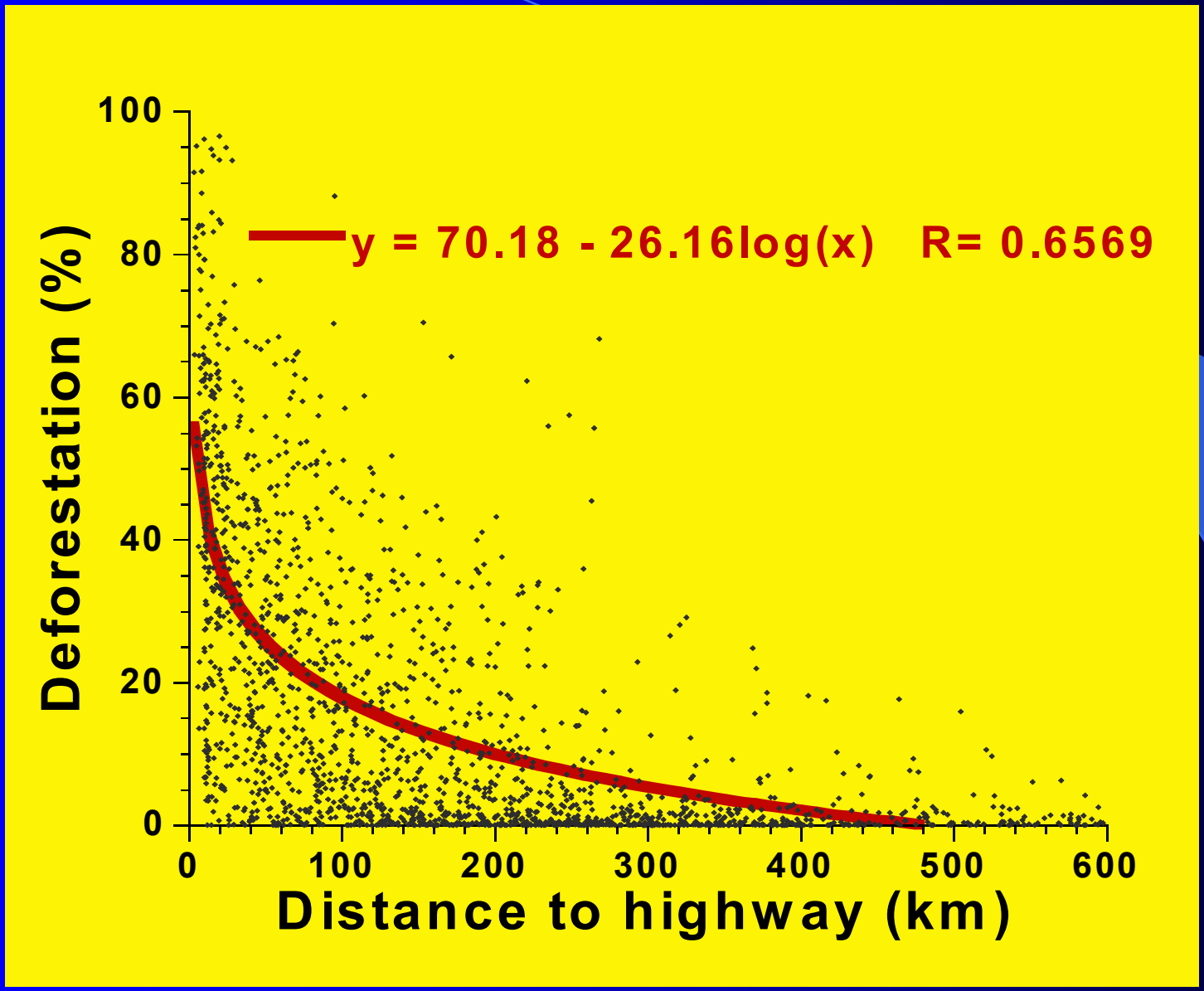
- Axis 1 (62%): gradient in rural & urban populations and highway density
- Axis 2 (26%): gradient in dry-season severity, river density, and road density
- Multiple regression: both axes highly significant ($P<0.0001$, $R^2=59.4\%$)

Simple Correlations

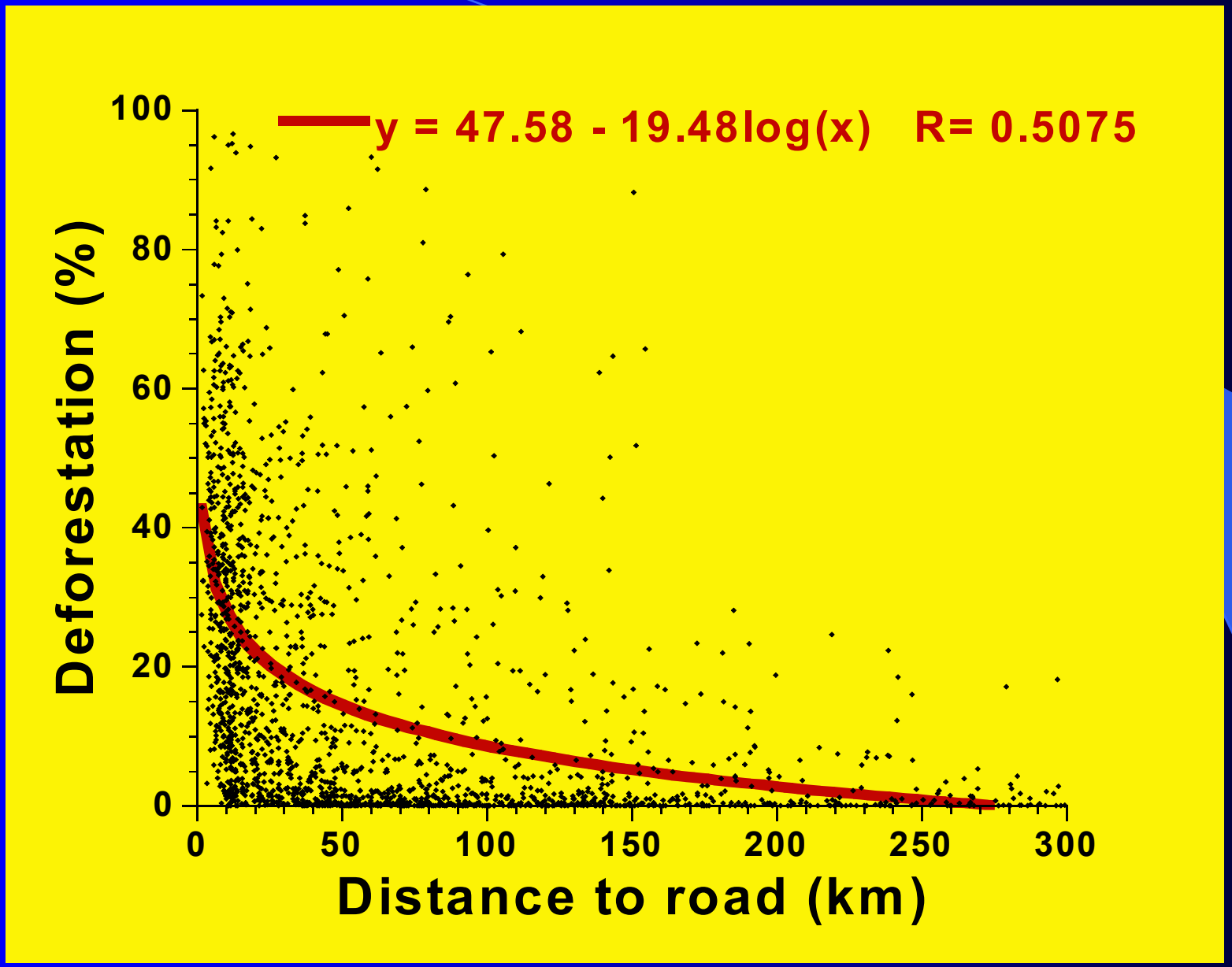
Bonferroni-corrected (P=0.005) with linearizing data transformations

- Highway distance, r = -0.76
- Rural-population density, r = 0.73
- Urban-population density, r = 0.66
- Dry-season severity, r = 0.44
- Road distance, r = -0.36

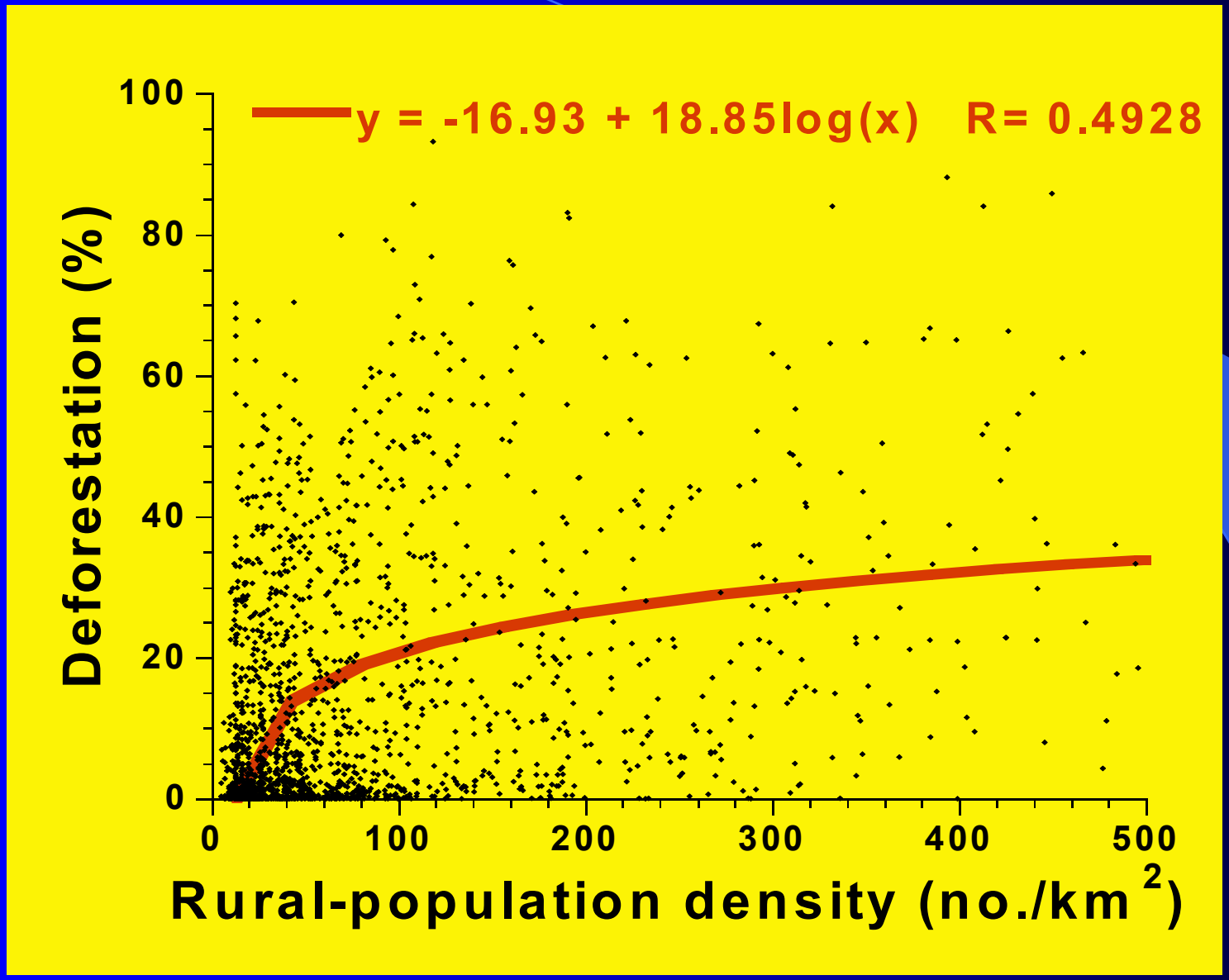
Highways


y = 70.18 - 26.16log(x) R= 0.6569
Deforestation (%)
100
80
60
40
20
0
0
100
200
300
400
500
600
Distance to highway (km)

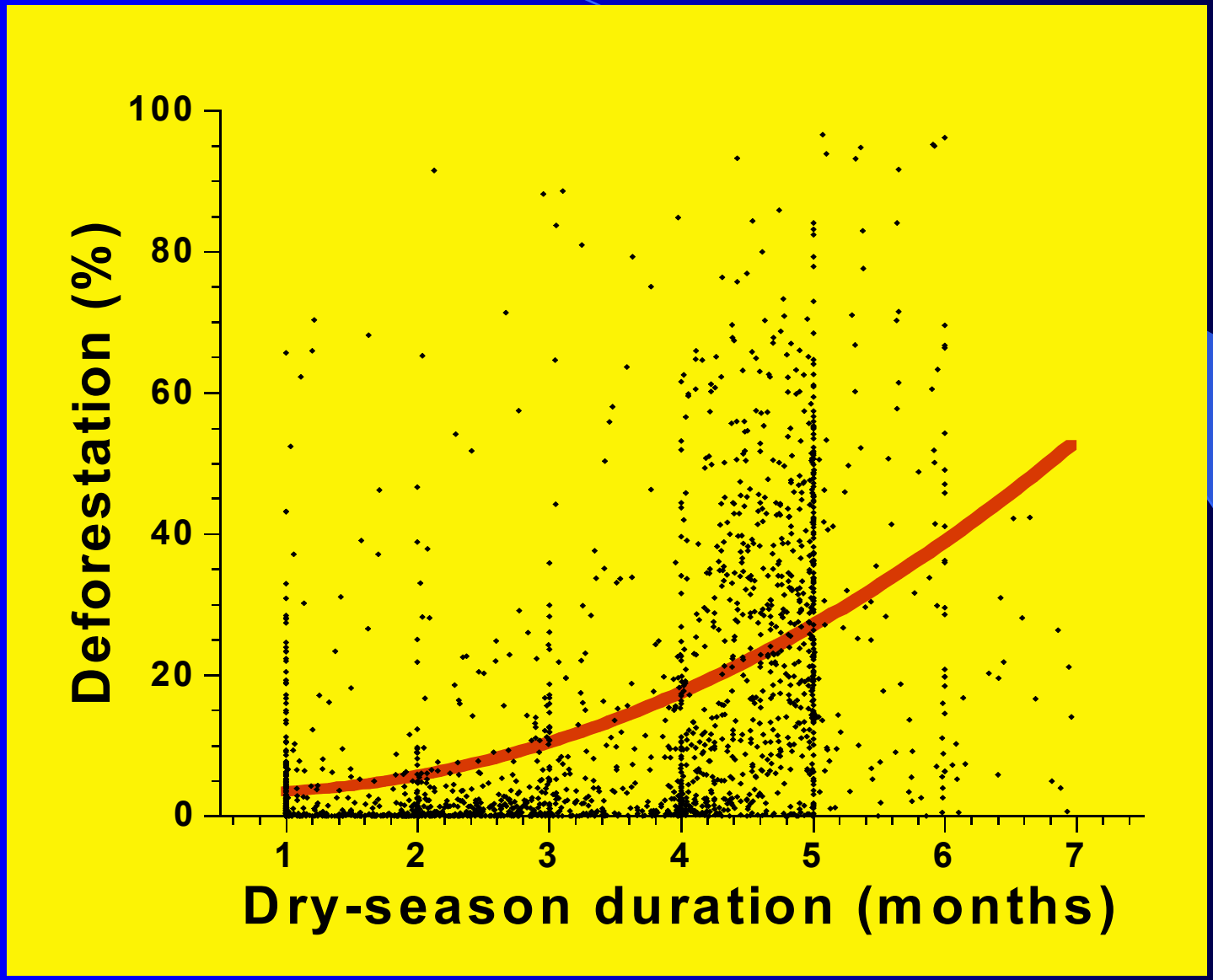
Roads


y = 47.58 - 19.48log(x) R= 0.5075
Deforestation (%)
100
80
60
40
20
0
0
50
100
150
200
250
300
Distance to road (km)

Rural Populations



Dry-Season Severity



Limitations of Analysis

- Many factors are both spatially autocorrelated and functionally related
- Causal relationships between factors and deforestation are sometimes complex
- Future studies should stratify sampling on each predictor, focus on subsets of basin to reduce intercorrelations among variables, and employ time-lags and path analyses

Preliminary Conclusions

- Amazonian deforestation is most strongly affected by highways, human population density, and dry-season severity
- Highways & roads have large-scale impacts
- Soil factors had little influence on deforestation, at least using available data
- Effect of navigable rivers was minor compared to impacts of highways & roads
- Results are not sensitive to spatial scale of analysis

Implications

- Government policies that encourage large-scale immigration into Amazon are a key driver of deforestation
- Initiatives to expand highways and infrastructure will have major impacts on forest loss and degradation
- Seasonal forests are most prone to deforestation, and future climatic changes may increase forest vulnerability