

The hidden cost of bananas: The effects of pesticides on newborns' health

PROBLEM

The rainfall and humidity in the winter season favor the spread of the *Sigatoka Negra* across the banana trees, and the presence of this fungus leads producers to intensify the fumigations.

There are few studies using information across communities demonstrating a causal effect.

GENERAL OBJECTIVE

To examine the effects of pesticides used in banana plantations in Ecuador on newborns' health outcomes (weight at birth, gestational length, low birth weight and preterm).

METHODS PROPOSED

We exploit the seasonal variation in the fumigation of banana plantations to estimate a DID model comparing the difference between newborns of mothers living in geographically exposed areas gestated during intensive and non-intensive fumigation seasons, relative to the difference between newborns living in non-exposed areas in the same two periods.

$$Y_{ijmy} = \beta_0 + \beta_1 \text{Banana Exposure}_{ijmy} + \sum_{z=1}^3 \beta_z Z^{th} \text{Intensive Fumigations}_{ijmy} + \sum_{z=1}^3 \theta_z \text{Banana Exposure}_{ijmy} * Z^{th} \text{Intensive Fumigations}_{ijmy} + \delta X_i + \mu_j + \psi_m + \phi_y + \varepsilon_{ijpmy}$$

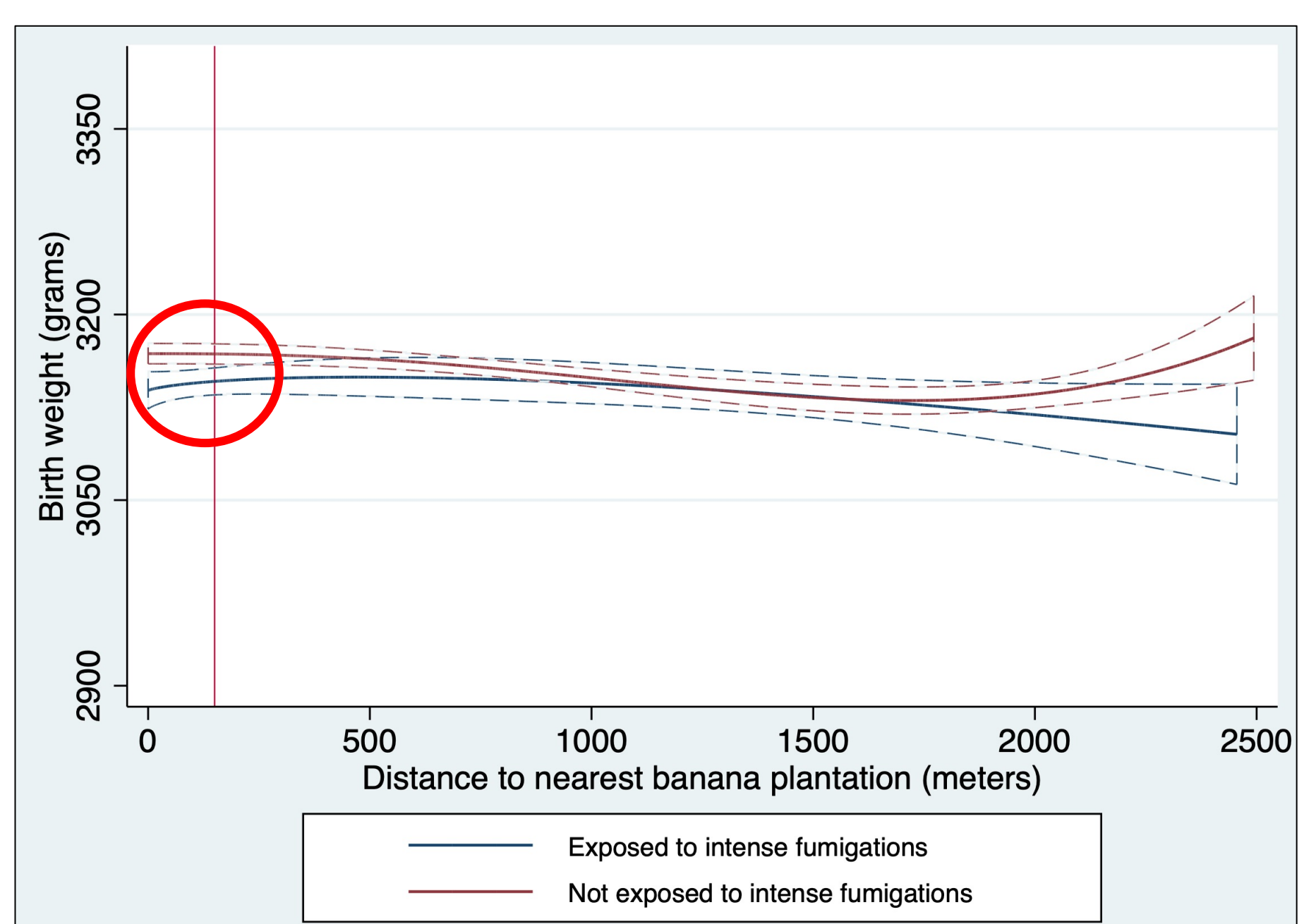
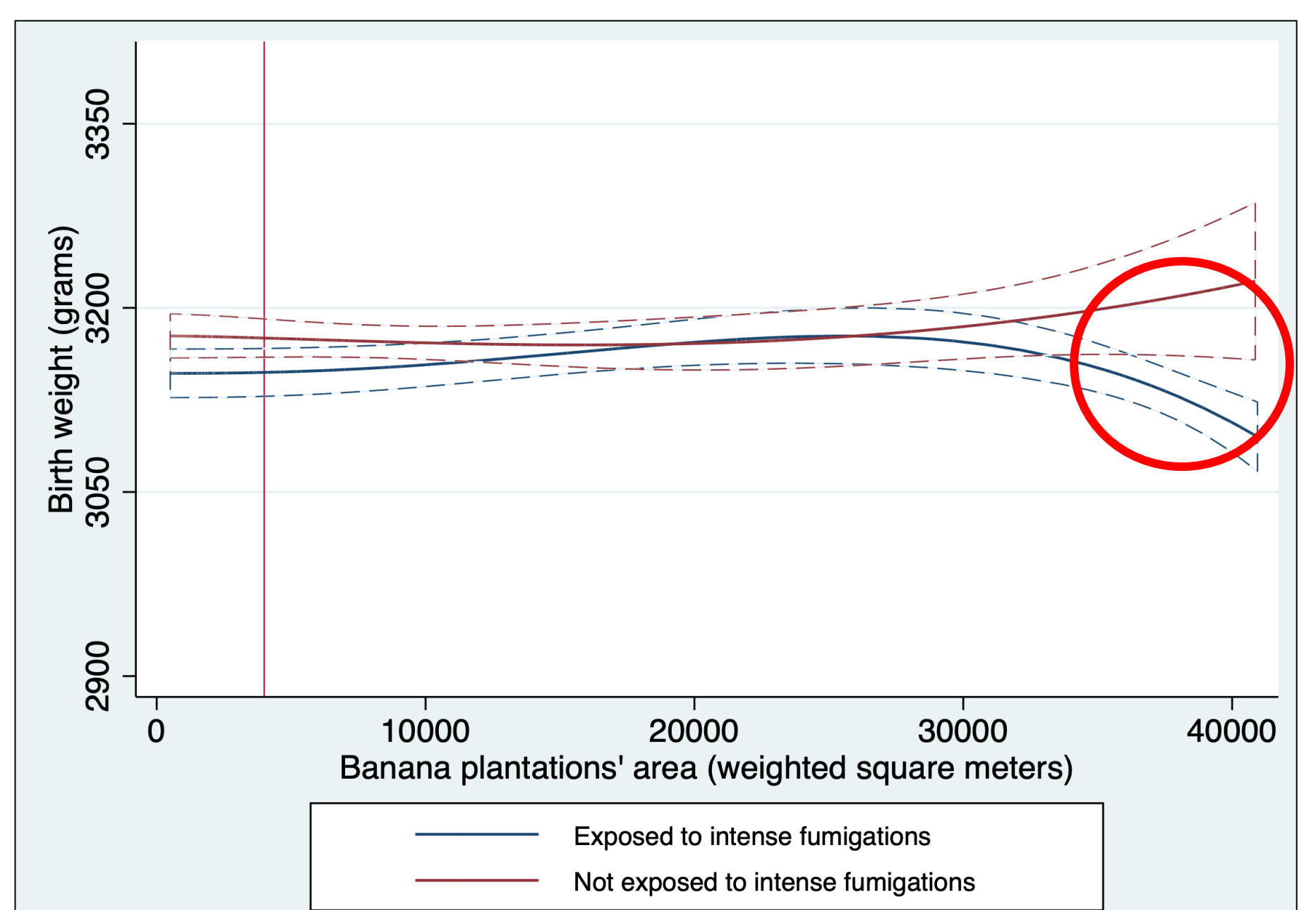
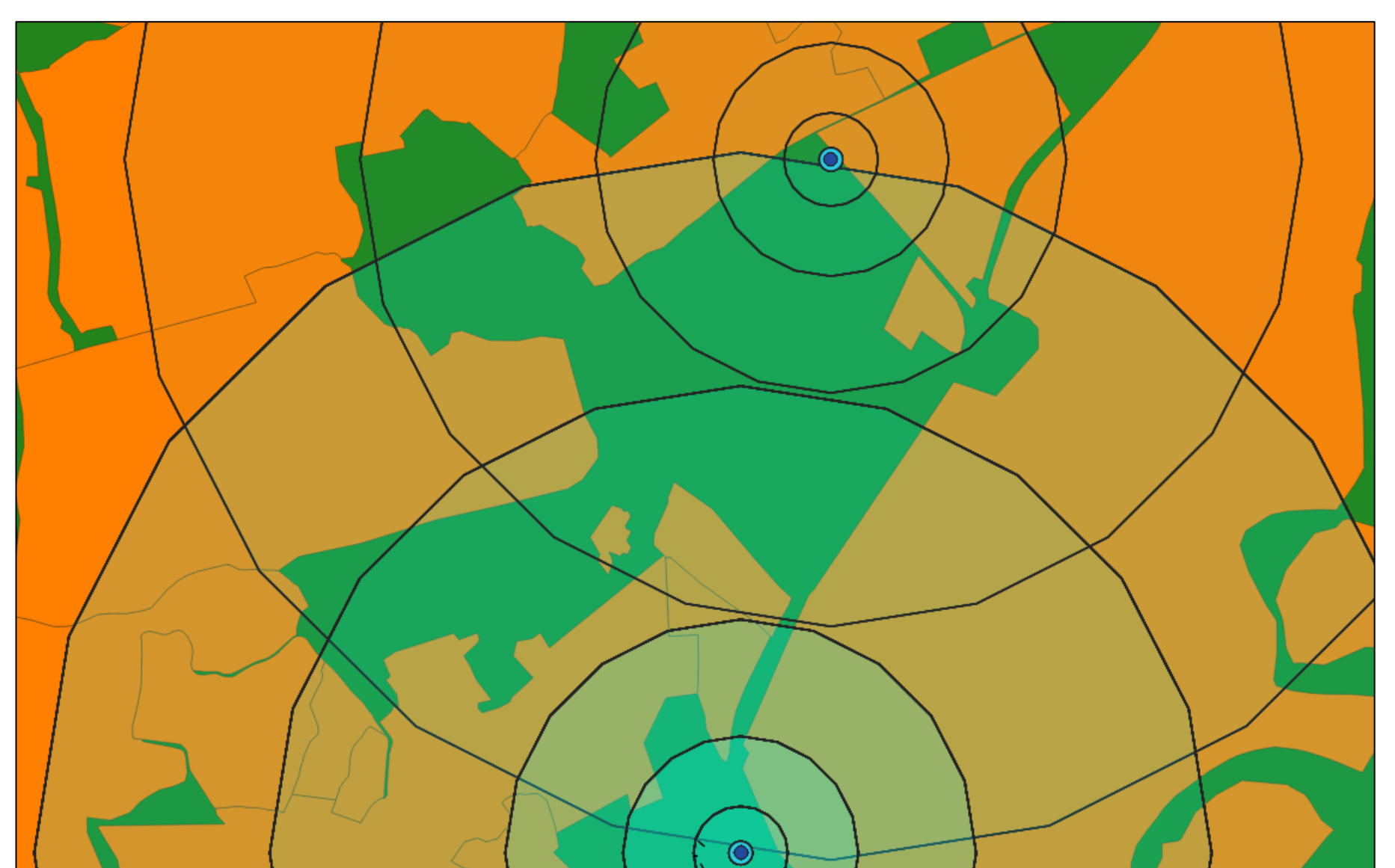
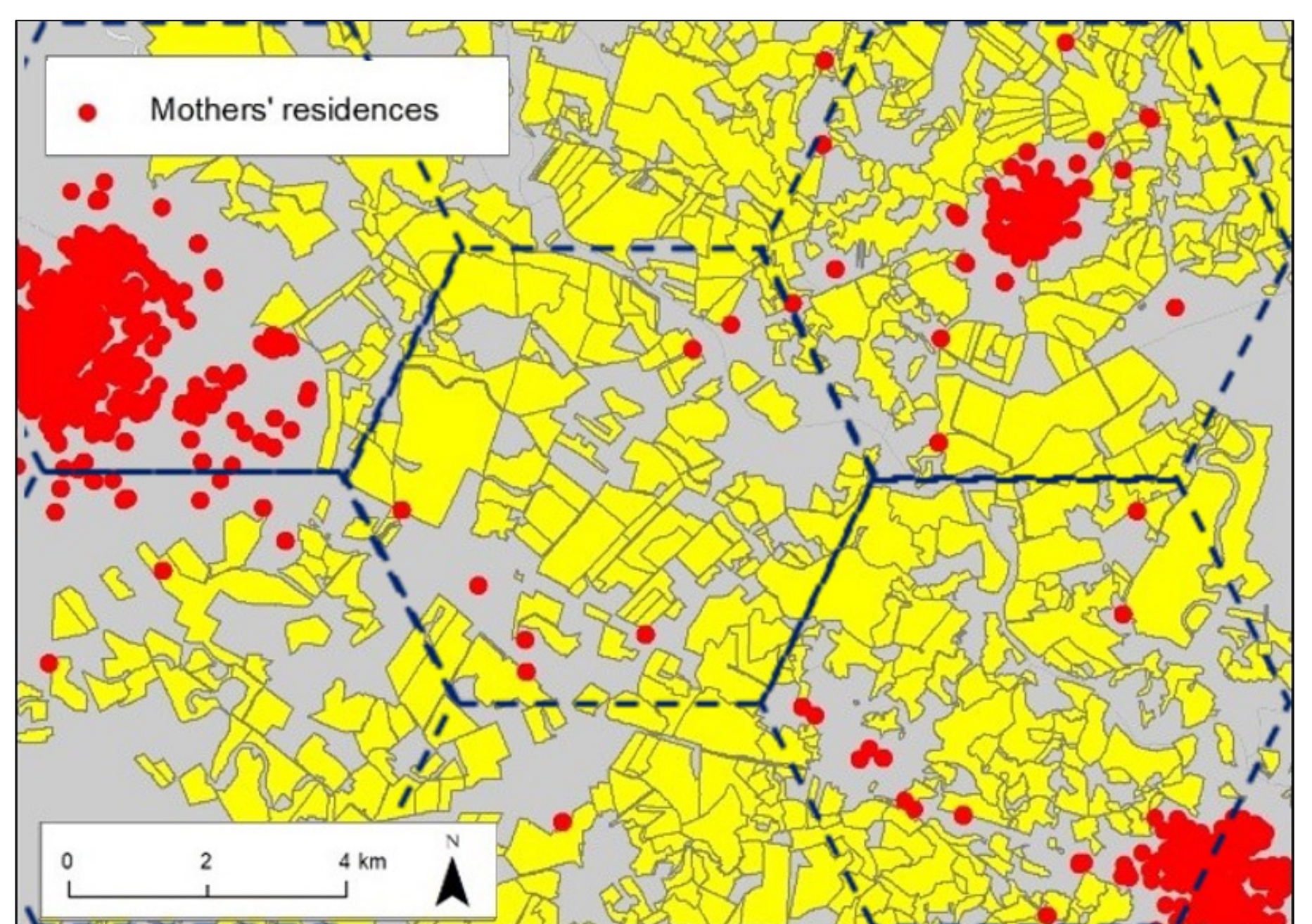
RESULTS

We confirm the hypothesis that pesticides have a statistically significant impact on newborns' birth weight:

- Newborns living close to the banana plantations and exposed to intensive fumigations during their gestational period have an average birthweight deficit of between **80 and 150 grams** relative to non-exposed newborns.
- **56.8% to 80%** increase in the likelihood of LBW if exposed in the first and second trimestre, respectively.
- Birthweight deficit of **327 grams** for those siblings geographically exposed to banana plantations and intensive fumigations, relative to their non-exposed siblings.
- Gestation period is nearly **1.5 weeks** shorter for siblings who were exposed to intense use of pesticides compared to those who were not exposed.

CONCLUSIONS

- Results in accordance with the findings reported in medical and environmental papers.
- The novelty of the paper relies on precise measurement and concludes that distance matters, but the surrounding area and the length of exposure matters much more.
- We conclude the effect relies on intensive use of pesticides..
- We highlight the urgency of enforcing and reviewing the protection distances established in Ecuador in 2012 and 2015.



ACHIEVEMENTS

- Paper aceptado y publicado en **JAERE**:
- <https://doi.org/10.1086/725349>
- Paper aceptado a ser presentado en **NBER Summer Institute 2023 – Children**
- <https://www.nber.org/conferences/si-2023-children>