The Hidden Cost of Bananas: The Effects of Pesticides on Newborns' Health

Joan Calzada, Meritxell Gisbert, Bernard Moscoso

Vinícius Hector Natália Trigo

JAERE (2023)

Environmental and Urban Economics
Professor: Sophie Mattes

March 26, 2024

- Increasing demand for agricultural productions, combined with land restrictions and changing weather has contribuited to the extensive use of agrochemicals
- Issue:This use of chemicals has severe negative effects on the populations living close to the farms or working on them
- But, still there are few studies analyzing the effects of enviromental pollution on health outcomes
    1. very few that leverage quasi-experimental variation to estimate the health effects of the use of pesticides in agriculture
- Goal of this paper: examine the effects of pesticides used in banana plantations in Ecuador on newborn's health outcomes

Why Ecuador?

- Provides an excellent context for analyzing the effects of pesticides use in agriculture
- Ecuador is the world's fifth largest banana producer and the largest exporter
- In the early 1970s, started to use aerial fumigation to treat fungal disease affecting banana fruit plants
- raised major concerns about their environmental and health implications

Empirical Strategy

- DiD approach that exploits the seasonal changes in the fumigation of banana plantations as an identification strategy
- 4 newborn's health outcomes: weight at birth, gestational length, low birth weight, and preterm
- Use of mother's address during pregnancy and precise information on the perimeter of the plantations to compute measures of exposure to air pollution
  1. compute the mother's distance from the plantation and the area of fumigated plantations near their place of residence

- the newborns potentially most affected by pesticides were those born to mothers living within 150 meters of fumigated plantations
- The paper use this result to construct a geographical exposure dummy variable (**Banana Exposure**) that defines the group of treated and control newborns
- Challenge: households living close to the plantations present different characteristics from those living further way
- Approach: exploits the seasonal changes in the intensity of fumigation. Fumigations are more intense during rainy season, which is when the fungus propagates more easily.

- They compute a seasonal exposure dummy (**Intensive Fumigations**)
  1. create a grid of 5x5 km cells
  2. the seasonal exposure variable takes the value 1 for newborns who during their gestation were for at least three months in a grid cell with more than four gallons of pesticides per hectare.
- DiD strategy is based on the seasonality of the fumigations of the plantations surrounding the mother's residence
- DiD approach compares:
  1. the difference between newborns born to mothers living in geographically exposed areas who were gestated during intensive and nonintensive fumigation seasons
     relative to
  2. the difference between newborns born to mothers living in geographically nonexposed areas who were gestated during the same two seasons

$$Y_{ijmy} = \beta_0 + \beta_1 \text{Banana Exposure}_{ijmy} + \beta_2 \text{Intensive Fumigations}_{ijmy} +$$

$$\theta \; [\text{ Banana Exposure}_{ijmy} \times \text{Intensive Fumigations}_{ijmy}] + \delta X_i +$$

$$\mu_j + \psi_m + \pi_y + \epsilon_{ijmy} (1)$$

$$Y_{ijmy} = \beta_0 + \beta_1 \text{Banana Exposure}_{ijmy} + \sum_{z=1}^{3} \beta_z Z^{th} \text{Intensive Fumigations}_{ijmy}$$

$$+ \sum_{z=1}^{3} \theta_z [\text{Banana Exposure}_{ijmy} \times Z^{th} \text{Intensive Fumigations}_{ijmy}] + \delta X_i + \mu_j + \psi_m + \pi_y + \epsilon_{ijmy} \quad (2)$$

- Y_{ijmy}: birth outcomes of newborn i, in a grid cell j, month m and year
- Banana Exposure$_{ijmy}$: is a dummy variable that takes the value 1 for newborns from mothers geographically exposed to pesticides
- Intensive Fumigations$_{ijmy}$: is a dummy variable that takes the value 1 for newborns that were affected by intensive fumigations for at least three months during gestation
- Z^{th}Intensive Fumigations$_{ijmy}$: is a dummy variable that takes the value 1 for the newborns that were affected by intensive fumigations during the three months of the Z^{th} gestation trimester.
- X: vector of controls

Preview of the results

- pesticides have a statistically significant impact on newborns' birth weight
- pesticides have a greater impact when intensive fumigations coincide with the first two trimesters of gestation
- exposure to pesticides reduces the number of gestations weeks and increases the odds of being born with low birth weight and of preterm delivery

Data

Newborn's health:

- dataset from the National Register of Live Births for the period 2015-17 (information on the mother's residential addresses during pregnancy)
- data set includes information on several observable characteristics of children and mothers

Ecuador's banana plantations:

- 2013 agricultural census
- 2016-18 register of aerial fumigations (geocoded data on the application of the pesticide)

Table 2

Table 2. Descriptive Statistics: Means (standard deviations) of Selected Variables

Variable	All Newborns (1)	Not Geographically Exposed to Banana Plantations (2)	Geographically Exposed to Banana Plantations (3)	Not Seasonally Exposed to Intensive Use of Pesticides (4)	Seasonally Exposed to Intensive Use of Pesticides (5)
Birth weight	3,127.8	3,119.1	3,151.8	3,113.8	3,143.2
	(3.53)	(4.11)	(6.88)	(4.94)	(5.04)
Gestation weeks	38.44	38.42	38.52	38.41	38.48
	(.01)	(.01)	(.02)	(.02)	(.02)
Low birth weight	.08	.08	.08	.09	.08
	(.00)	(.00)	(.00)	(.00)	(.00)
Preterm	.06	.06	.06	.07	.06
	(.00)	(.00)	(.00)	(.00)	(.00)
Mother's age	24.53	24.59	24.36	24.57	24.48
	(.04)	(.05)	(.09)	(.06)	(.07)
Male newborn	.51	.51	.52	.52	.51
	(.00)	(.00)	(.01)	(.00)	(.00)
Mother's education < high school	.43	.41	.49	.42	.44
	(.00)	(.00)	(.01)	(.00)	(.00)
Mestizo ethnicity	.96	.96	.97	.96	.96
	.01	(.00)	(.00)	(.00)	(.00)
Normal birth	.53	.52	.57	.53	.53
	(.00)	(.00)	(.01)	(.00)	(.00)
Nonmarital union	.40	.4	.39	.4	.39
	(.00)	(.00)	(.01)	(.00)	(.00)
Single	.42	.42	.44	.42	.43
	(.00)	(.00)	(.01)	(.00)	(.00)
Married	.14	.14	.13	.13	.14
	(.00)	(.00)	(.00)	(.00)	(.00)
Public hospital	.83	.81	.89	.85	.82
	(.00)	(.00)	(.00)	(.00)	(.00)
Number of births	2.28	2.27	2.34	2.29	2.28
	(.01)	(.01)	(.02)	(.01)	(.01)
Number of children	2.32	2.3	2.38	2.33	2.32
	(.01)	(.01)	(.02)	(.01)	(.01)
Prenatal control	6.03	6.05	5.98	6.03	6.02
	(.02)	(.02)	(.03)	(.02)	(.02)
Single birth	.99	.99	.98	.98	.99
	(.00)	(.00)	(.00)	(.00)	(.00)
Observations	21,393	15,686	5,707	11,182	10,211

Table 2

Table 2

Descriptive Statistics: Means (standard deviations) of Selected Variables

	Subset 1: All Newborns	**Subset 2:** bx = 0	**Subset 3:** bx = 1	**Subset 4:** pxp = 0	**Subset 5:** pxp = 1
Weight	3127.812	3119.075	3151.825	3113.795	3143.162
	(516.55)	(515.1)	(519.82)	(522.84)	(509.16)
Gestation Weeks	38.443	38.416	38.518	38.41	38.479
	(1.6)	(1.6)	(1.61)	(1.64)	(1.56)
I(Low Birth Weight)	0.082	0.082	0.081	0.086	0.077
	(0.27)	(0.27)	(0.27)	(0.28)	(0.27)
I(Preterm Birth)	0.063	0.064	0.063	0.067	0.059
	(0.24)	(0.24)	(0.24)	(0.25)	(0.24)
Mother Age	24.527	24.587	24.364	24.575	24.475
	(6.55)	(6.52)	(6.65)	(6.46)	(6.66)
I(Newborn Male)	0.514	0.513	0.516	0.515	0.512
	(0.5)	(0.5)	(0.5)	(0.5)	(0.5)
I(Mother Education < High School)	0.431	0.407	0.495	0.424	0.438
	(0.5)	(0.49)	(0.5)	(0.49)	(0.5)
I(Newborn Mestizo)	0.964	0.96	0.974	0.965	0.964
	(0.19)	(0.19)	(0.16)	(0.18)	(0.19)
I(Normal Birth)	0.53	0.516	0.571	0.535	0.526
	(0.5)	(0.5)	(0.49)	(0.5)	(0.5)
I(Mother has Nonmarital Union)	0.398	0.399	0.394	0.403	0.392
	(0.49)	(0.49)	(0.49)	(0.49)	(0.49)
I(Mother is Single)	0.424	0.419	0.438	0.419	0.429
	(0.49)	(0.49)	(0.5)	(0.49)	(0.5)
I(Mother is Married)	0.137	0.14	0.127	0.135	0.139
	(0.34)	(0.35)	(0.33)	(0.34)	(0.35)
I(Born in Public Hospital)	0.833	0.815	0.886	0.846	0.82
	(0.37)	(0.39)	(0.32)	(0.36)	(0.38)
No. of Previous Labors	2.285	2.266	2.338	2.289	2.28
	(1.46)	(1.43)	(1.53)	(1.45)	(1.46)
No. of Other Children	2.324	2.303	2.381	2.327	2.32
	(1.51)	(1.47)	(1.59)	(1.5)	(1.51)
No. of Prenatal Care Visits	6.027	6.045	5.976	6.031	6.022
	(2.21)	(2.19)	(2.26)	(2.17)	(2.24)
I(Not Twins)	0.985	0.986	0.984	0.984	0.987
	(0.12)	(0.12)	(0.12)	(0.13)	(0.11)
No. of Observations	21393	15686	5707	11182	10211

bx = I(Banana Exposure)

pxp = I(Intensive Fumigation)

Table 3

Table 3. Effects of the Seasonal Intensification of Fumigations on Birth Weight

	Birth Weight					
	(1)	(2)	(3)	(4)	(5)	(6)
Banana Exposure	−48.58	.998	−37.59	−33.93	−49.38	−5.965
	(39.57)	(50.21)	(47.72)	(43.96)	(51.55)	(47.67)
Intensive Fumigation		29.64***				
		(10.09)				
Banana Exposure × Intensive Fumigation		−80.02***				
		(30.81)				
Intensive Fumigation during first trimester			17.58			24.19*
			(14.23)			(14.03)
Intensive Fumigation during second trimester				14.34		20.09
				(15.04)		(15.65)
Intensive Fumigation during third trimester					8.135	18.26
					(17.88)	(16.27)
Banana Exposure × Intensive Fumigation during first trimester			−47.44**			−74.29**
			(20.58)			(32.61)
Banana Exposure × Intensive Fumigation during second trimester				−63.09***		−75.40***
				(20.40)		(24.44)
Banana Exposure × Intensive Fumigation during third trimester					4.933	−43.17
					(23.54)	(37.84)
Mother's controls	X	X	X	X	X	X
Month × year fixed effects	X	X	X	X	X	X
Grid fixed effects	X	X	X	X	X	X
Observations	21,393	21,393	21,393	21,393	21,393	21,393
R^2	.1096	.1102	.1098	.1100	.1096	.1104
Number of clusters	151	151	151	151	151	151

Table 3

Table 3

Effects of the Seasonal Intensification of Fumigations on Birth Weight

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
bx	-48.581 (45.07)	0.998 (49.29)	-37.59 (44.73)	-33.933 (35.96)	-49.382 (46.77)	-5.965 (51.24)
	[-136.92, 39.76]	[-95.61, 97.61]	[-125.26, 50.08]	[-104.41, 36.55]	[-141.05, 42.29]	[-106.39, 94.46]
pxp		**29.637* (12.2)**				
		[5.73, 53.54]				
bx_pxp		**-80.022* (32.67)**				
		[-144.06, -15.98]				
pxt1			17.582 (16.35)			24.188 (15.59)
			[-14.47, 49.63]			[-6.37, 54.75]
pxt2				14.342 (16.74)		20.091 (14.21)
				[-18.46, 47.14]		[-7.76, 47.94]
pxt3					8.135 (17.63)	18.258 (16.06)
					[-26.42, 42.69]	[-13.21, 49.73]
bx_pxt1			**-47.438* (22.17)**			**-74.285* (32.34)**
			[-90.9, -3.98]			[-137.68, -10.89]
bx_pxt2				**-63.091* (22.31)**		**-75.4* (25.76)**
				[-106.82, -19.36]		[-125.88, -24.92]
bx_pxt3					4.933 (23.64)	-43.172 (37.76)
					[-41.4, 51.26]	[-117.19, 30.85]

bx = I(Banana Exposure)

pxp = I(Intensive Fumigation)

pxtN = I(Intensive Fumigation during Nth trimester)

bx_pxtN = I(Banana Exposure) x I(Intensive Fumigation during Nth trimester)

Robust Standard Errors in Parentheses; *p < 0.05

Figure: Table 3 from Replication

Table 4

Table 4. Effects of the Seasonal Intensification of Fumigations on Gestation Weeks, Preterm, and Low Birth Weight

	OLS Fixed Effects		Logit Fixed Effects			
	Gestation Weeks		Preterm Birth		Low Birth Weight	
	(1)	(2)	(3)	(4)	(5)	(6)
Banana Exposure	.0482	.106	1.250	1.252	1.304	1.249
	(.153)	(.154)	(.360)	(.281)	(.287)	(.248)
Intensive Fumigation	.0125		.829**		.791***	
	(.0385)		(.0710)		(.0648)	
Banana Exposure × Intensive Fumigation	−.0183		1.426		1.429**	
	(.105)		(.400)		(.259)	
Intensive Fumigation during first trimester		.0631*		.747**		.714***
		(.0366)		(.106)		(.0902)
Intensive Fumigation during second trimester		−.0417		1.029		.849*
		(.0580)		(.155)		(.0822)
Intensive Fumigation during third trimester		−.00557		.989		.869*
		(.0375)		(.103)		(.0668)
Banana Exposure × Intensive Fumigation during first trimester		−.142**		1.470**		1.568***
		(.0677)		(.269)		(.221)
Banana Exposure × Intensive Fumigation during second trimester		−.121*		1.461*		1.799***
		(.0728)		(.293)		(.246)
Banana Exposure × Intensive Fumigation during third trimester		−.0594		1.319		1.204
		(.0686)		(.229)		(.176)
Mother's controls	X	X	X	X	X	X
Month × year fixed effects	X	X	X	X	X	X
Grid fixed effects	X	X	X	X	X	X
Observations	21,393	21,393	20,871	20,871	21,086	21,086
R^2	.0842	.0850	. . .	. . .	. . .	. . .
Pseudo-R^2	. . .	. . .	.1161	.1170	.1170	.1180
Number of clusters	151	151	91	91	99	99

Table 4

Table 4

Effects of the Seasonal Intensification of Fumigations on Gestation Weeks, Preterm, and Low Birth Weight

	Gestation Weeks		Preterm		Low Birth Weight	
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
bx	0.048 (0.13)	0.106 (0.19)	1.25 (0.85)	1.252 (0.57)	1.304 (0.46)	1.249 (0.43)
	[-0.21, 0.31]	[-0.27, 0.49]	[-0.41, 2.92]	[0.13, 2.37]	[0.4, 2.21]	[0.4, 2.1]
pxp	0.012 (0.04)		**0.829* (0.07)**		**0.791* (0.06)**	
	[-0.06, 0.09]		[0.68, 0.98]		[0.67, 0.91]	
bx_pxp	-0.018 (0.1)		1.426 (0.67)		1.429 (0.41)	
	[-0.22, 0.18]		[0.11, 2.75]		[0.62, 2.24]	
pxt1		0.063 (0.04)		0.747 (0.13)		**0.714* (0.09)**
		[-0.01, 0.13]		[0.49, 1.01]		[0.54, 0.89]
pxt2		-0.042 (0.06)		1.029 (0.17)		**0.849* (0.08)**
		[-0.17, 0.08]		[0.7, 1.36]		[0.7, 1]
pxt3		-0.006 (0.04)		0.989 (0.1)		0.869 (0.07)
		[-0.09, 0.08]		[0.79, 1.19]		[0.73, 1]
bx_pxt1		**-0.142* (0.06)**		1.47 (0.34)		1.568 (0.29)
		[-0.25, -0.03]		[0.81, 2.13]		[0.99, 2.14]
bx_pxt2		-0.121 (0.08)		1.461 (0.42)		**1.799* (0.27)**
		[-0.29, 0.04]		[0.64, 2.28]		[1.27, 2.33]
bx_pxt3		-0.059 (0.07)		1.319 (0.33)		1.204 (0.33)
		[-0.2, 0.08]		[0.67, 1.96]		[0.55, 1.86]

bx = I(Banana Exposure)

pxp = I(Intensive Fumigation)

pxtN = I(Intensive Fumigation during Nth trimester)

bx_pxtN = I(Banana Exposure) x I(Intensive Fumigation during Nth trimester)

Robust Standard Errors in Parentheses; *p < 0.05

Figure: Table 4 from Replication

Table 5

Table 5. Effects of the Seasonal Intensification of Fumigations on Birth Weight and Gestation Weeks: Maternal Fixed Effects

	Birth Weight				Gestation Weeks			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Banana Exposure	38.04	77.94	109.5		−.711	−.643	−.346	
	(154.9)	(176.5)	(186.2)		(.679)	(.727)	(.815)	
Intensive Fumigation		13.04				.535**		
		(66.84)				(.252)		
Banana Exposure × Intensive Fumigation		−122.4				−.268		
		(129.1)				(.438)		
Intensive Fumigation during first trimester			121.2	90.25			.574	.396
			(97.20)	(101.2)			(.365)	(.323)
Intensive Fumigation during second trimester			−94.10	−130.5			.146	.322
			(111.2)	(100.6)			(.429)	(.545)
Intensive Fumigation during third trimester			64.10	74.84			.702*	.674*
			(103.7)	(121.5)			(.399)	(.398)
Banana Exposure × Intensive Fumigation during first trimester			−327.0*	−319.0***			−1.539*	−1.614***
			(175.2)	(108.2)			(.795)	(.406)
Banana Exposure × Intensive Fumigation during second trimester			92.60	163.8			−.156	−.439
			(135.0)	(141.4)			(.540)	(.492)
Banana Exposure × Intensive Fumigation during third trimester			−246.2	−239.3			−1.407**	−1.508***
			(179.4)	(147.6)			(.647)	(.511)
Mother's controls	X	X	X	X	X	X	X	X
Month × year fixed effects	X	X	X	X	X	X	X	X
Maternal to grid fixed effects	X	X	X	X	X	X	X	X
Observations	1,961	1,961	1,961	1,567	1,961	1,961	1,961	1,567
R^2	.861	.861	.862	.873	.848	.849	.850	.879
Number of mothers	970	970	970	777	970	970	970	777

Table 5

Table 5

Effects of the Seasonal Intensification of Fumigations on Birth Weight and Gestation Weeks: Maternal Fixed Effects

	Birth Weight				Gestation Weeks			
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**	**Model 7**	**Model 8**
bx	38.039 (139.75)	77.943 (168.47)	109.523 (170.01)		-0.711 (0.74)	-0.643 (0.98)	-0.346 (1.1)	
	[-235.87, 311.95]	[-252.25, 408.13]	[-223.69, 442.74]	[NaN, NA]	[-2.16, 0.74]	[-2.56, 1.27]	[-2.51, 1.82]	[NaN, NA]
pxp		13.04 (71.66)				0.535 (0.5)		
		[-127.42, 153.5]				[-0.44, 1.51]		
bx_pxp		-122.395 (196.32)				-0.268 (0.68)		
		[-507.18, 262.39]				[-1.6, 1.06]		
pxt1			121.196 (128)	90.251 (171.58)			0.574 (0.32)	0.396 (0.59)
			[-129.68, 372.08]	[-246.05, 426.55]			[-0.05, 1.19]	[-0.76, 1.55]
pxt3			64.096 (126.47)	74.836 (157.87)			0.702 (0.47)	0.674 (0.48)
			[-183.78, 311.97]	[-234.59, 384.26]			[-0.21, 1.62]	[-0.26, 1.61]
bx_pxt2			92.603 (177.55)	163.779 (271.6)			-0.156 (0.83)	-0.439 (0.77)
			[-255.39, 440.59]	[-368.55, 696.11]			[-1.78, 1.47]	[-1.94, 1.06]
pxt2			-94.101 (128.42)	-130.495 (155.52)			0.146 (0.62)	0.322 (0.71)
			[-345.81, 157.6]	[-435.32, 174.33]			[-1.08, 1.37]	[-1.08, 1.72]
bx_pxt1			-327.019 (191.36)	-319.05 (190.85)			-1.539 (0.88)	-1.614 (0.84)
			[-702.08, 48.04]	[-693.12, 55.02]			[-3.27, 0.19]	[-3.26, 0.03]

bx = I(Banana Exposure)

pxp = I(Intensive Fumigation)

pxtN = I(Intensive Fumigation during Nth trimester)

bx_pxtN = I(Banana Exposure) x I(Intensive Fumigation during Nth trimester)

Robust Standard Errors in Parentheses; *p < 0.05

Figure: Table 5 from Replication

Table 6

Table 6. Effects of the Seasonal Intensification of Fumigations on Maternal Characteristics: Main Estimation Approach

	OLS Fixed Effects				Logit Fixed Effects		
	Number of Labors (1)	Number of Children (2)	Pregnancy Output (3)	Prenatal Controls (4)	Education (5)	Private Hospital (6)	Type of Birth (7)
Banana Exposure	−.0321	.0351	−.0189**	.256	.806**	.810	.827
	(.0237)	(.0243)	(.00916)	(.234)	(.0704)	(.203)	(.132)
Intensive Fumigation	−.00665	.00570	−.00537	.0126	1.094**	.857***	1.034
	(.00764)	(.00876)	(.00362)	(.0666)	(.0481)	(.0493)	(.0369)
Banana Exp. × Intensive Fumigation	−.00302	.00259	.000543	−.222*	.916	1.195	.871*
	(.0122)	(.0129)	(.0109)	(.117)	(.0847)	(.327)	(.0659)
Mother's controls	X	X	X	X	X	X	X
Month × year fixed effects	X	X	X	X	X	X	X
Grid fixed effects	X	X	X	X	X	X	X
Observations	21,393	21,393	21,393	21,393	21,347	15,986	21,340
R^2	.975	.975	.201	.155	...	...	...
Pseudo-R^2	...	...	...	...	.109	.375	.152
Number of clusters	151	151	151	151	134	110	130

Table 6

Table 6

Effects of the Seasonal Intensification of Fumigations on Maternal Characteristics: Main Estimation Approach

	OLS with FE				Logit with FE		
	Model 1: No. of Labors	**Model 2:** No. of Children	**Model 3:** No. of Babies from Labor	**Model 4:** No. of Prenatal Visits	**Model 5:** I(Education)	**Model 6:** I(Private Hospital)	**Model 7:** I(Natural Labor)
bx	-0.032 (0.02)	0.035 (0.03)	**-0.019* (0.01)**	0.256 (0.25)	**0.806* (0.09)**	0.81 (0.22)	0.827 (0.24)
	[-0.07, 0.01]	[-0.02, 0.09]	[-0.04, 0]	[-0.23, 0.74]	[0.64, 0.98]	[0.38, 1.24]	[0.35, 1.3]
pxp	-0.007 (0.01)	0.006 (0.01)	-0.005 (0)	0.013 (0.07)	1.094 (0.07)	**0.857* (0.05)**	1.034 (0.04)
	[-0.02, 0.01]	[-0.01, 0.03]	[-0.01, 0]	[-0.12, 0.15]	[0.96, 1.22]	[0.75, 0.96]	[0.96, 1.11]
bx_pxp	-0.003 (0.01)	0.003 (0.01)	0.001 (0.01)	-0.222 (0.13)	0.916 (0.1)	1.195 (0.34)	0.871 (0.13)
	[-0.02, 0.02]	[-0.03, 0.03]	[-0.02, 0.02]	[-0.48, 0.03]	[0.73, 1.1]	[0.53, 1.86]	[0.62, 1.12]

bx = I(Banana Exposure)

pxp = I(Intensive Fumigation)

bx_pxp = I(Banana Exposure) x I(Intensive Fumigation)

Robust Standard Errors in Parentheses; *p < 0.05

Figure: Table 6 from Replication

Conclusion

- Aerial pesticide fumigation plays a key role in the agricultura industry, but his uncontrolled and massive use can cause major health problems
- This study contributes to the existing literatura by examining the causal relationship between newborns' in utero-exposure to pesticides
- Newborns exposed to intensive fumigations have a birth weight deficit of between 80 and 150 grams
- The exposure to intensive fumigations increases the odds of LBW and of being preterm by over 46%