Profitability of Fertilizer: Experimental Evidence from Female Rice Farmers in Mali

by Beaman et al. (AER: Paper and Proceedings 2013)

Johannes Schmieden

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Motivation

Why is it interesting to look at the profitability of fertilizer in Mali?

→ Mali belongs to sub-Saharan Africa(SSA)

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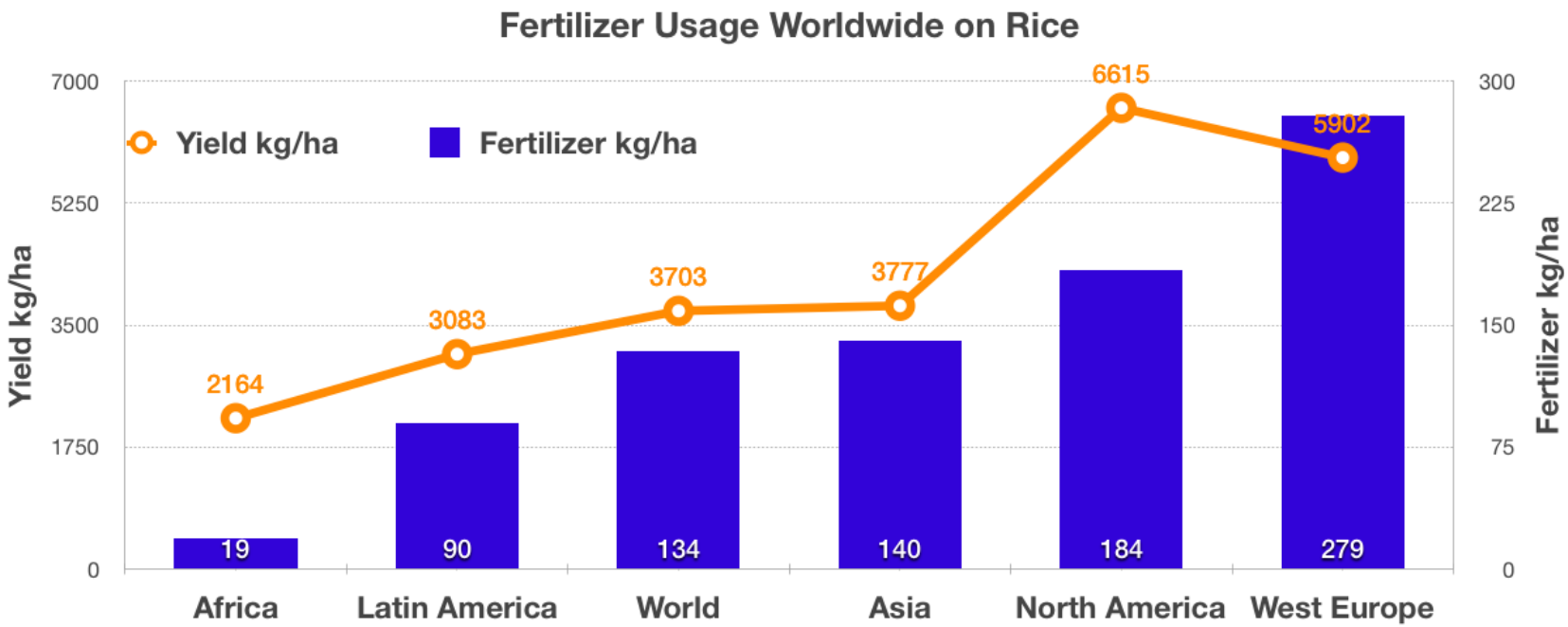

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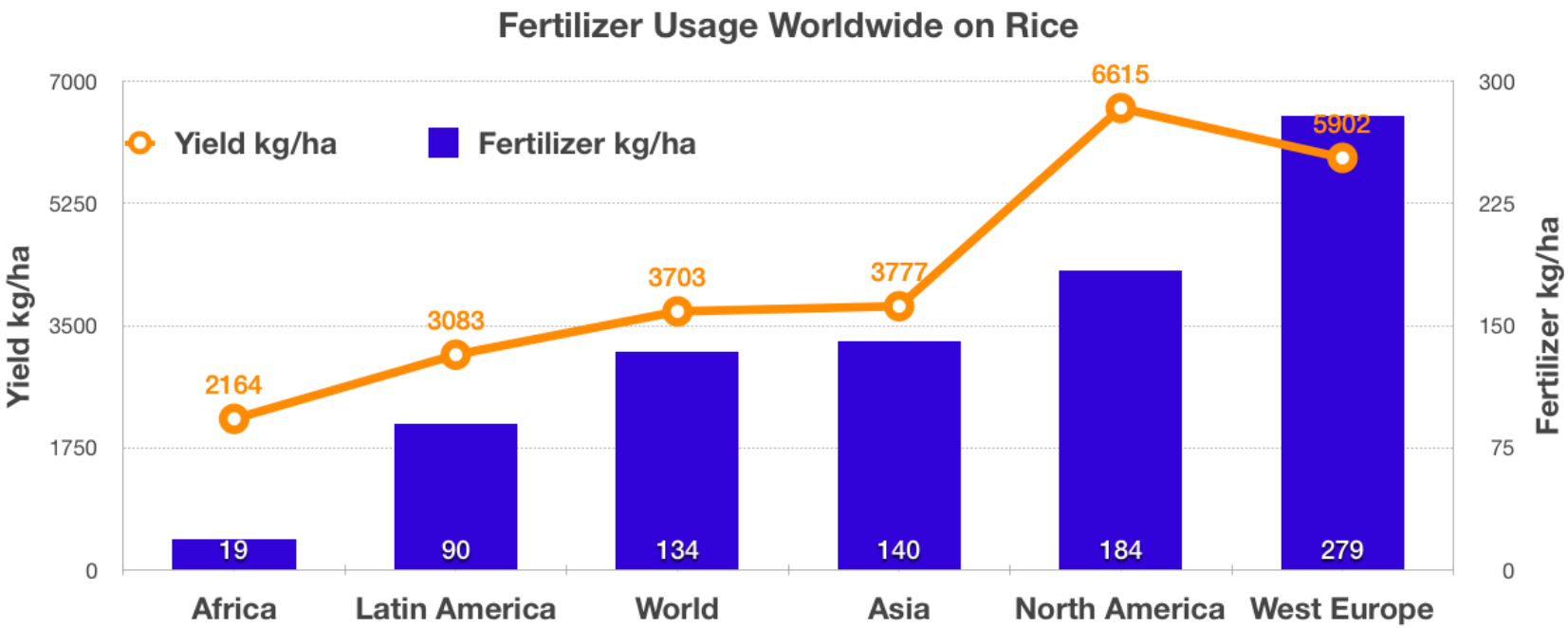

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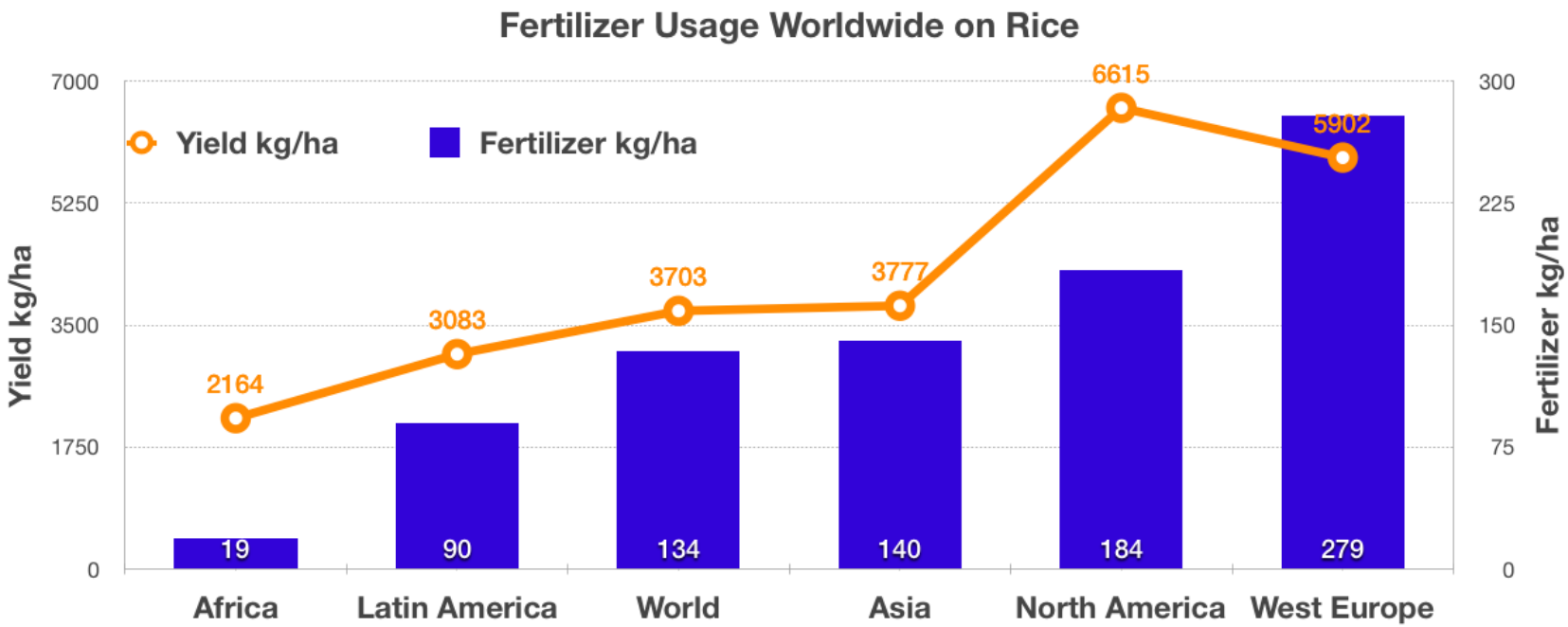

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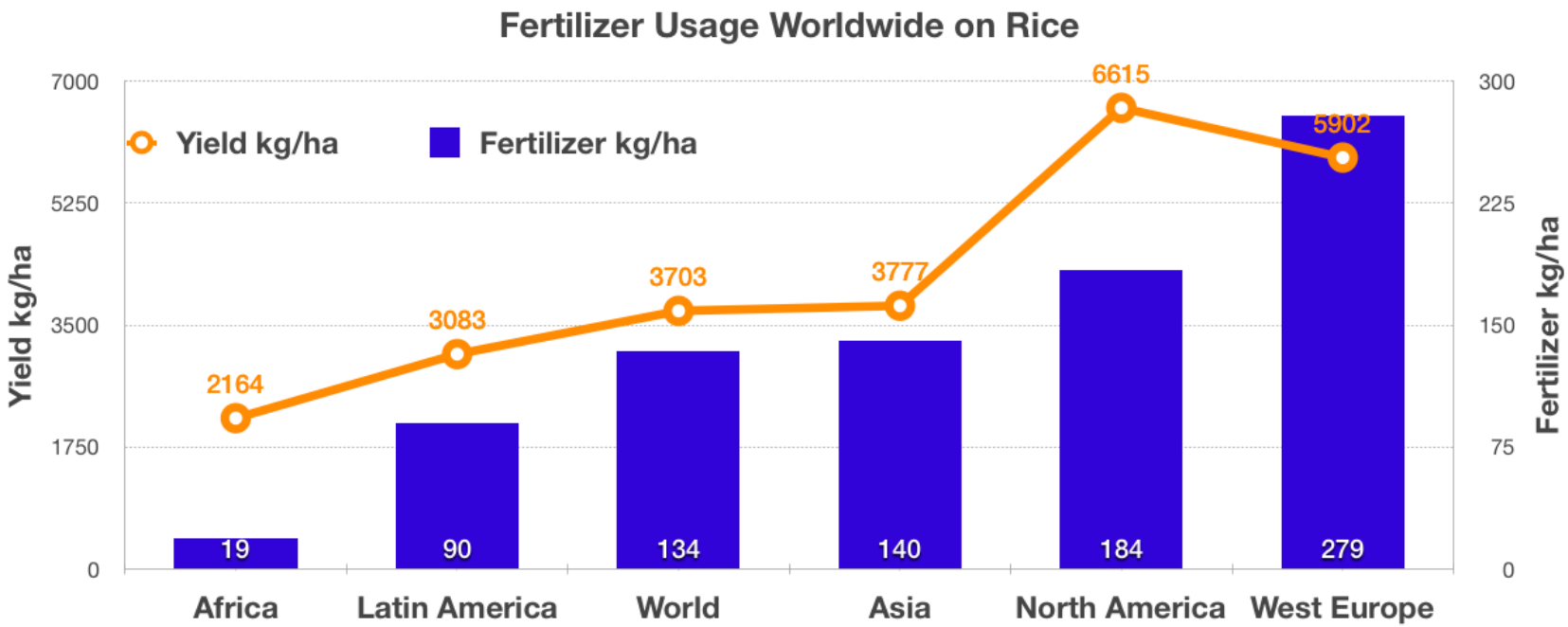

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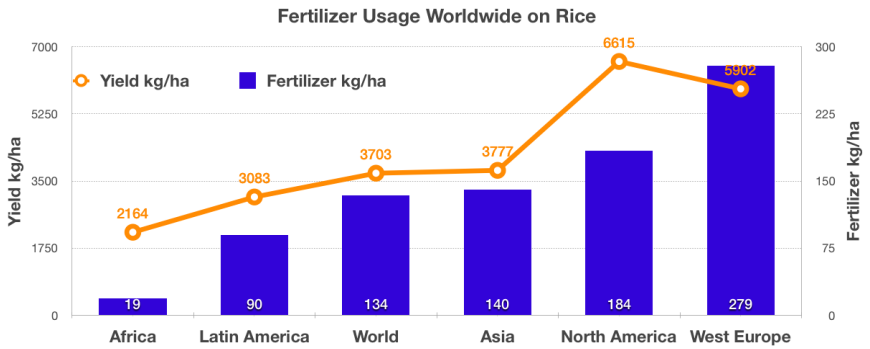

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- Informational barriers
- Credit constraints
- Behavioral biases
- Heterogenous yield returns adopting to fertilizer

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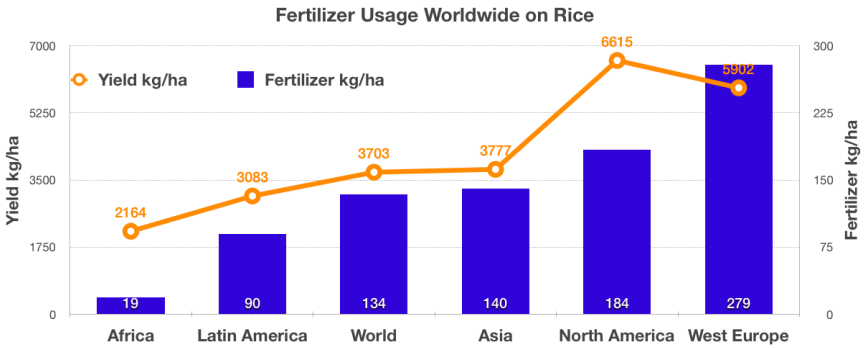

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Field Experiment - Randomized Control Trial

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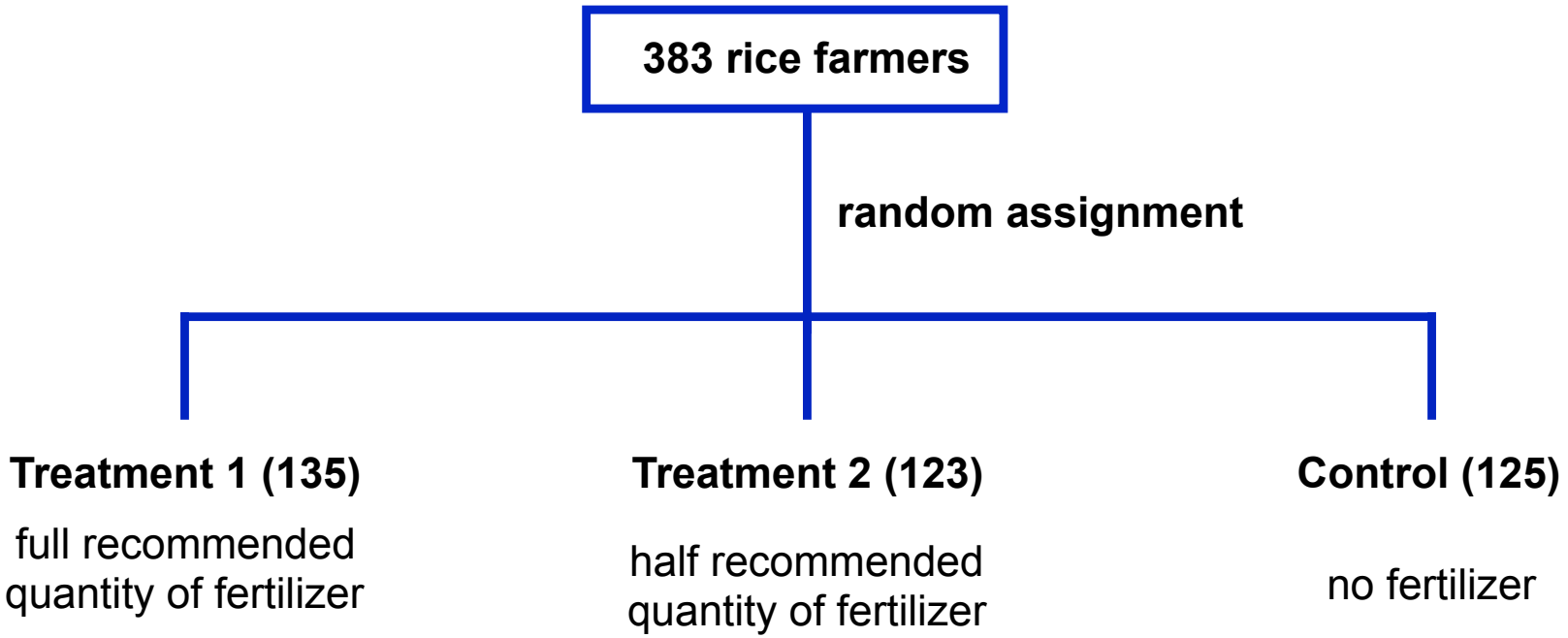

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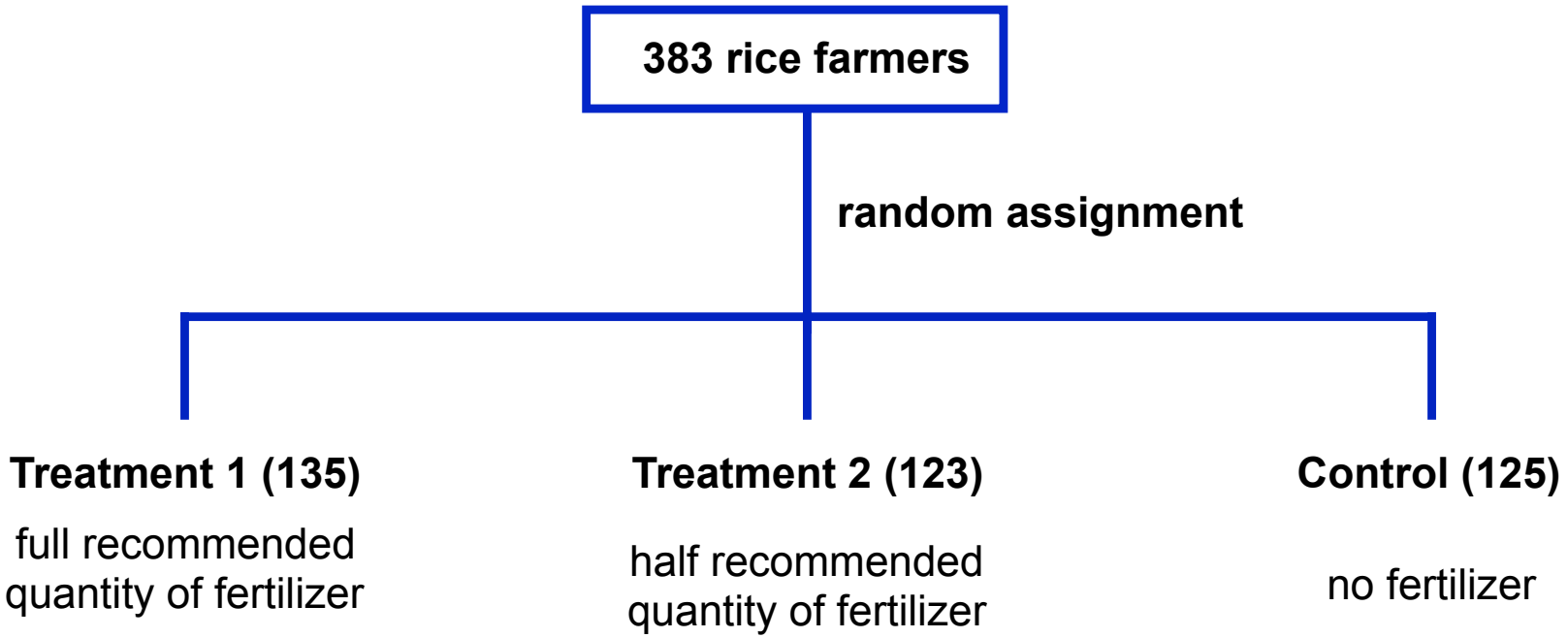

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Field Experiment - Results

Regression equation

$$y_{ijt} = \beta_0 + \beta_1 half_{ijt} + \beta_2 full_{ijt} + \beta_3 y_{ij(t-1)} + \beta_4 x_{ij(t-1)} + \delta_j + \epsilon_{ijt}$$

Field Experiment - Results on Inputs

	Input use			Input expenses				
	Use of fertilizer	Fertilizer quantity used (Kg)	Family labor (days)	Fertilizer expenses (FCFA)	Herbicides (FCFA)	Expenses on hired labor (FCFA)	Total input expenses (excl. fertilizer) (FCFA)	Total inputs (incl. value of fertilizer used) (FCFA)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Treatment (half)	0.64***	21.28***	2.84	-2412.91***	1012.54*	1075.15*	1705.06	7061.32***
	(0.04)	(4.10)	(4.32)	(536.70)	(533.73)	(602.21)	(1139.86)	(1641.05)
Treatment (full)	0.64***	32.91***	-4.73	-3011.97***	999.8*	2353.15***	3003.96***	11450.61***
	(0.04)	(4.05)	(4.27)	(532.16)	(527.71)	(594.93)	(1130.02)	(1627.02)
p-value: half = 1/2 * full	0.00	0.17	0.16	0.05	0.27	0.85	0.84	0.35
N	378	378	378	377	378	378	377	377
Mean of Control	0.32	13.17	59.76	3585.16	3855.24	2967.74	9685.77	12993.70
SD of Control	0.47	28.08	37.11	7871.52	4942.22	3632.80	10000.33	14399.81

Notes:

1) Standard errors are in parentheses. *p<.10, **p<.05, ***p<.01

2) Column (1) is a linear probability model while columns (2)-(8) show OLS estimates where the dependent variable is identified in the column heading. Also included in all specifications is the lagged dependent variable, an indicator for when the baseline value is missing, village fixed effects and the control variables used in the randomization routine (whether or not there is an extended household, use of fertilizer, use of plough and an agricultural asset index).

3) The dependent variable in (7) is the sum of those in (5) and (6), and expenses on seeds, ploughing, rental of carts, manure and chemicals other than fertilizer and herbicides such as e.g. insecticides and pesticides.

4) p-value: half = 1/2* full reports the p value of a Wald test that the impact of the half treatment is 1/2 the size of the full treatment.

5) The mean and SD of control are values of the column heading variable at endline in only control villages.

Field Experiment - Results on Output

TABLE 4—OUTPUT (WOMEN, RICE PLOTS)

	Value output (FCFA)	Profits (FCFA)	Profits (subtracting value of family labor) (FCFA)	Profits (subtracting fertilizer costs only) (FCFA)
	(1)	(2)	(3)	(4)
Treatment (half)	5952.23*	-1101.05	-2446.13	593.56
	(3549.27)	(3253.79)	(3193.44)	(3277.51)
Treatment (full)	11045.78***	-115.82	1458.83	2936.29
	(3504.60)	(3226.97)	(3167.06)	(3237.35)
p-value: half = 1/2 * full	0.89	0.71	0.25	0.76
N	372	371	371	372
Mean of Control	35919.50	22971.13	-1220.54	32649.88
SD of Control	31406.16	28880.84	27573.59	29660.41

Notes:

1) Standard errors are in parentheses. *p<.10, **p<.05, ***p<.01

2) All columns show OLS estimates where the dependent variable is identified in the column heading. Also included in all specifications is the lagged dependent variable, an indicator for when the baseline value is missing, village fixed effects and the control variables used in the randomization routine (whether or not there is an extended household, use of fertilizer, use of plough and an agricultural asset index).

3) Family labor is valued at 400 FCFA per day in column (3).

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Thank you for your attention!