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RESILIENT ROOTS: NAVIGATING COVID-19'S IMPACT ON SMALL-SCALE AGRICULTURE IN BRAZIL'S NORTHEAST Ana Paula de la O Campos (The Food and Agriculture Organization of the United Nations, FAO), anapaula.delaocampos@fao.org Katia Covarrubias (The Food and Agriculture Organization of the United Nations, FAO), katia.covarrubias@fao.org Selected Poster prepared for presentation at the 2024 Agricultural & Applied Economics Association Annual Meeting, New Orleans, LA: July 28-30, 2024

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RESILIENT ROOTS: NAVIGATING COVID-19'S IMPACT ON SMALL-SCALE AGRICULTURE IN BRAZIL'S NORTHEAST





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BACKGROUND

- By July 2020, Brazil was severely impacted by COVID-19, ranking second globally in both cases and fatalities, with significant effects on its
- Small-scale family farmers, primarily serving local markets, were notably vulnerable during the pandemic, highlighting their susceptibility to external disruptions and emphasizing the need for research into their
- We partnered with the Articulação Semiárido Brasileiro (ASA), a network of over 3,000 organizations, to document the strategies taken by family farmers in response to the pandemic (FAO, 2023).
- COVID-19 related lockdowns led to the closure of essential wet markets and food stores, affecting farmers' access to inputs and markets, and compounded by the added risk of virus exposure, affectedagricultural

OBJECTIVES

- Farmers' agricultural decisions are impacted by factors such as market imperfections, information asymmetries, credit constraints, and price and climatic shocks. These all affect production decisions especially when shocks coincide with
- We assess the impact of pandemic lockdown restrictions on farmers' livelihood strategies, and the outcomes of those decisions, in Brazil's semi-arid region to
- a. Whether and how family farmers adjust their production strategies in response to lockdown policies.
- b. How farmers' factors of production, access to credit and social protection and farming profiles condition their decision-making.
- c. How production strategies led to outcomes in the levels of
- farmers' agricultural incomes.

- impoverished populations.
- coping mechanisms and recovery processes.

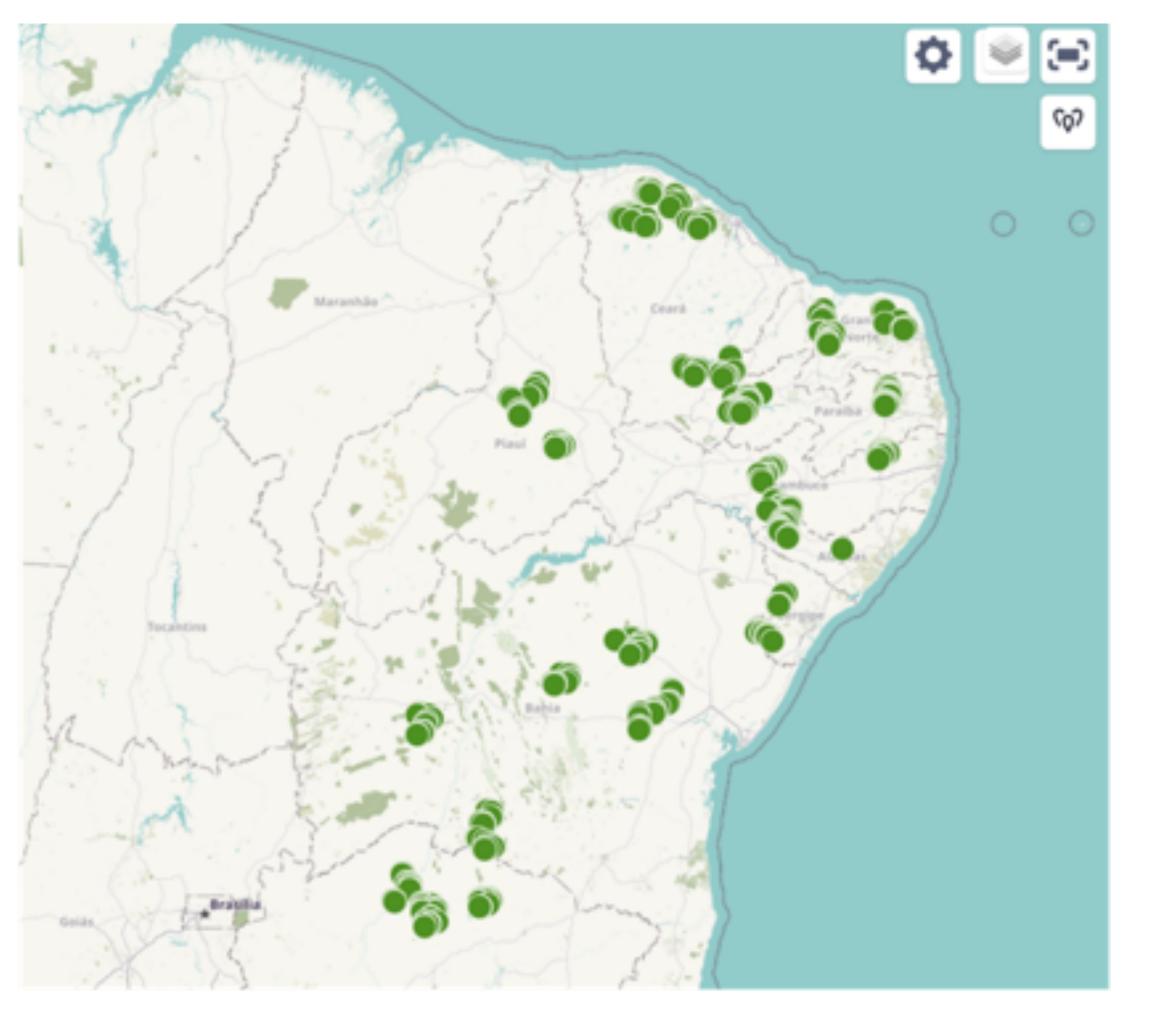
- critical agricultural seasons (Carter and Barrett, 2006; Singh et al., 1986).

METHODS

- The study conducted a longitudinal, household-level survey of beneficiaries of the P1+2 program (see box) implemented by ASA in Brazil's semi-arid regions. A multi-stage, stratified cluster sampling approach enabled a statelevel representative sample design.
- Data was collected in December 2020 and February March 2022; the final sample followed 1,693 households over the two periods.
- This comprehensive dataset facilitated an in-depth analysis of the P1+2 program, assessing its impact and effectiveness in supporting beneficiaries across the semi-arid regions of nine Brazilian states.

Since 2007, ASA's One Land, Two Waters Programme or "P1+2" transfers water technologies and provides trainings on water management and agroecological practices to thousands of farmers in nine states of the semiarid territory of Brazil.

Source: ASA (Articulação Semiárido Brasileiro). 2024. ASA. [Cited 20 February 2024]. https://www.asabrasil.org.br



Source: FAO. 2023. Brazilian semiarid survey – Family farmers' resilience strategies during COVID-19. Rome. https://doi.org/10.4060/cc4136en

METHODS

- Two main estimation approaches are used to model the changes in household livelihood strategies in response to the pandemic and the consequences on agricultural income levels.
- First, we model farmer's production choices by categorizing them into three options: producing more, producing less, or maintaining the same level of agricultural production. These changes are estimated using a Correlated True Random Effects model, based on the estimation of a multinomial probit model, augmented with a Mundlak (1978) correction to mitigate potential biases from correlations between farmer or household-specific heterogeneities and the explanatory covariates.

$$p_{it,j} = p(y_{it} = j) = \Phi(x'_{it}\beta_j)$$
 Equation 1

- Then, we model the impact of those production decisions on agricultural income, categorized similarly as having increased, decreased or remained stable.
- A bivariate probit model, specified following Wooldrige and Win (2017) enables the joint estimation of the change in production strategy on shifts in agricultural income.

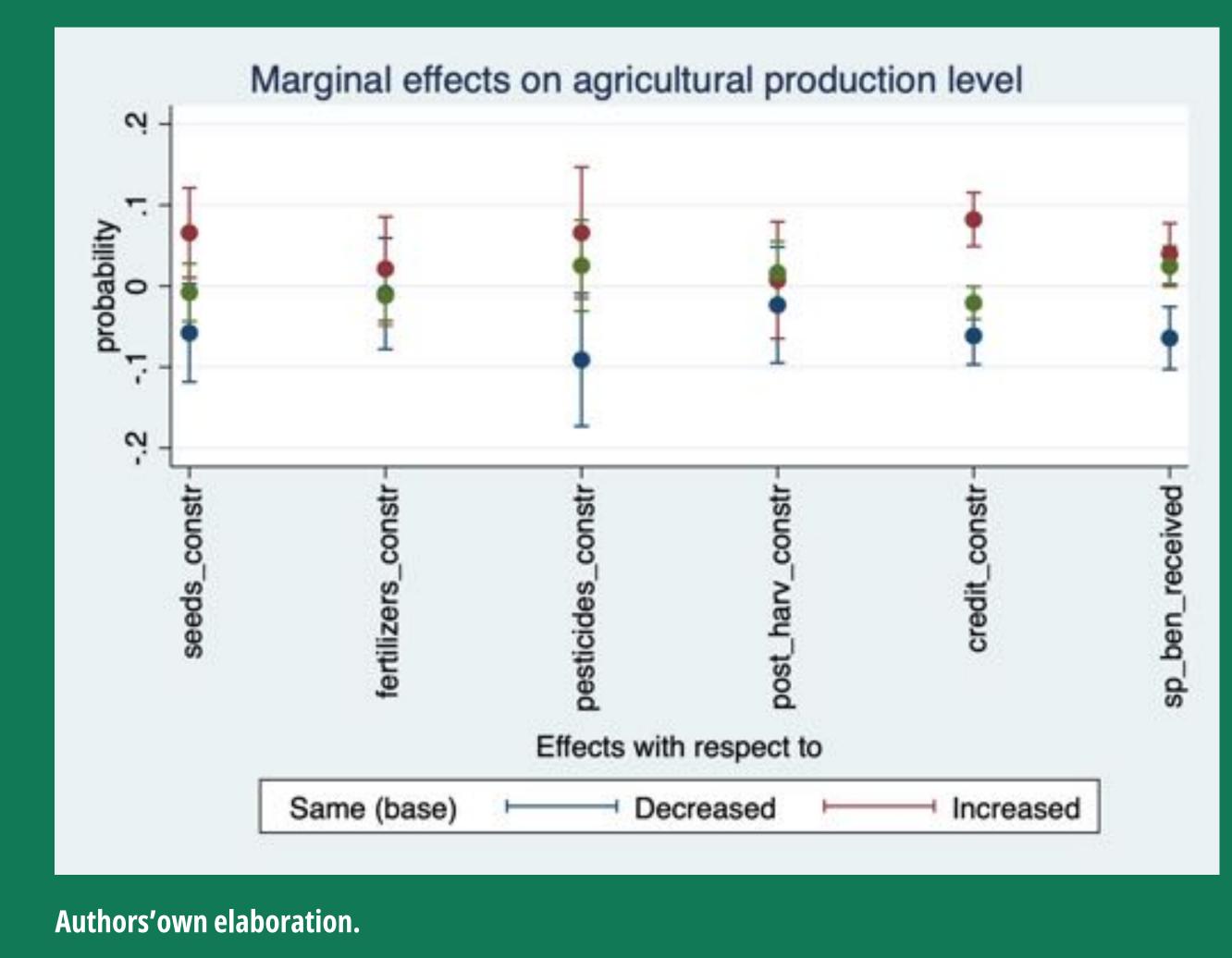
$$y_1^* = x\beta + y_2'\delta + \varepsilon_1$$

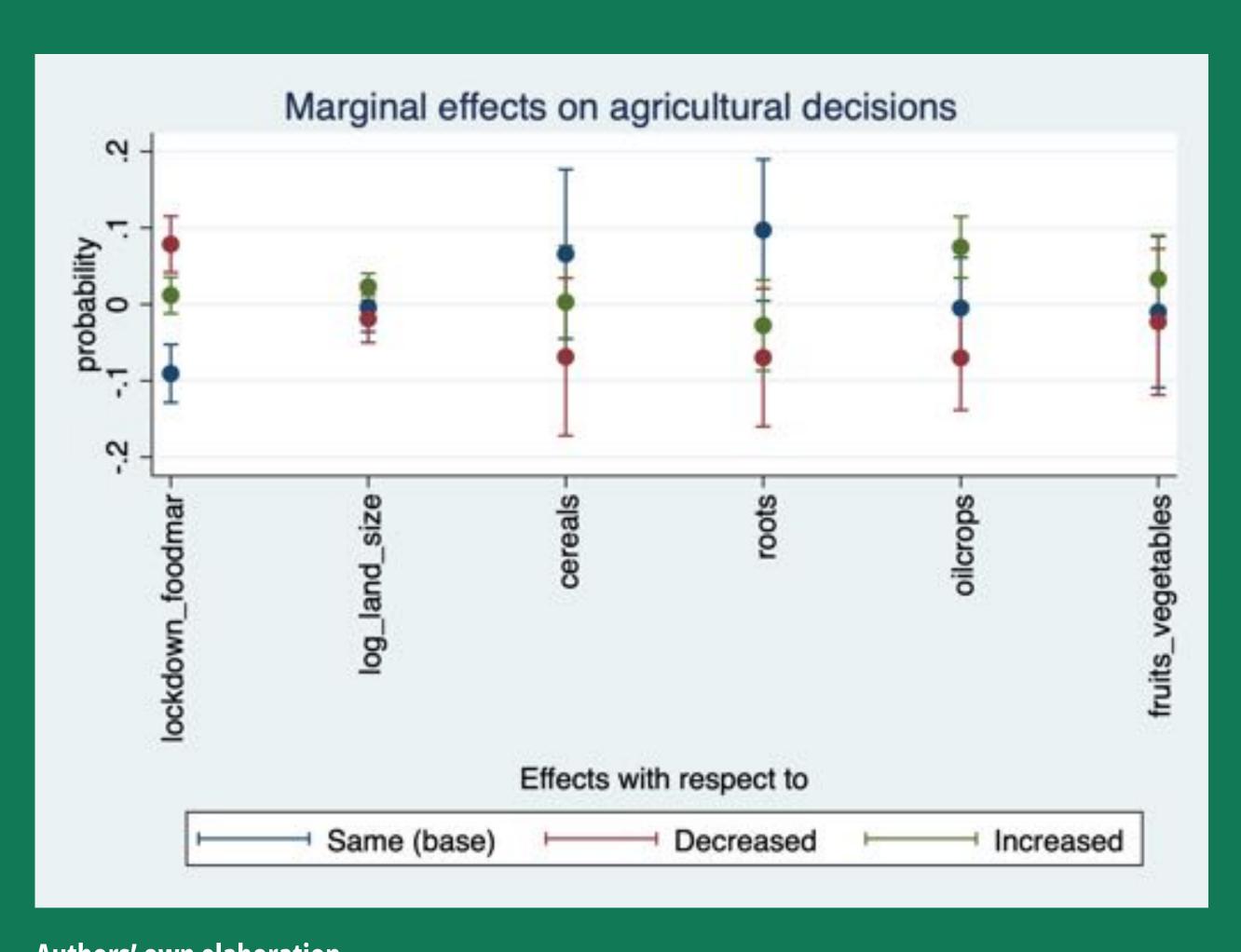
 $y_2^* = z\gamma + \varepsilon_2$ Equation 2

- Both models are analysed in relation to experiencing lockdowns and market closures, particularly wet markets and other food and input markets, conditional on household demographics, capital endowments (land, assets), labor, organizational membership, social protection (Auxilio Emergencial), and credit access.
- To enhance how to model accounts for farmer risk preferences, and based on Paxson (1992) and Skoufias and Vinha (2013), we utilize climate variables, namely monthly rainfall precipitation from the ERA5-Land database and two measures of rainfall variability over the past 30 years, as proxy measures.

RESULTS & DISCUSSION

- By analyzing farmers' decisions through an income maximization framework, we confirm our hypothesis that decisions on diversification depend on households' risk preferences, ability to smooth consumption against income shocks, and the costs of reducing levels of production.
- Lockdowns and market closures affected farming decisions, increasing the likelihood of both decreasing and increasing production levels; specifically, cultivating oil crops tended to boost production, whereas cultivating roots and flowers decreased the likelihood of reducing production.
- Constraints in accessing seeds, extension services, and credit were associated with a higher probability of reducing farming levels, while social protection via cash transfers influenced both increases and decreases in production.
- A reduction in agricultural production levels generally led to lower household incomes, indicating that farmers adjusted their activities to mitigate the adverse effects of COVID-19, albeit at the cost of reduced income.





Authors' own elaboration.

CONCLUSION

- Risk is an important source of poverty and an impediment to livelihood resilience (Fafchamps, 2009).
- Beyond social protection, more direct support to small-scale producers is needed during pandemics. While the Food Acquisition Programme (PAA) received extra funding to assist farmers, the funding was deemed insufficient given the extensive disruptions caused by the pandemic (Sambuichi et al., 2020).
- Agri-food supply chains should be considered as an essential service to ensure food security, including in times of pandemics.
- The pandemic may have also fostered community support and trust, which could enhance cooperation and solidarity in agricultural production and sourcing of inputs (observed in our study in the sourcing of seeds), echoing broader observations on how disasters can reshape community dynamics and economic behaviors.



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