The impact of large-scale land acquisitions on food security

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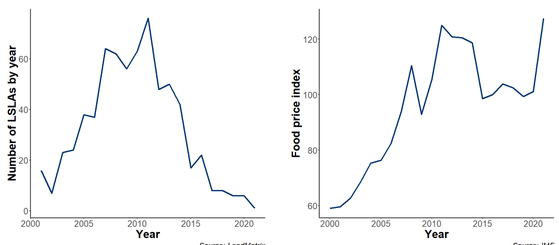
Motivations

The 2008 global food price crisis led to a surge in land investment. Foreign investors acquired large lands area to operate farms, especially in Africa. These acquisitions are called “Large-Scale land acquisitions” (LSLAs).



As Figure 1 shows, the surge was intense but short-lived. However, the food prices are now at an even higher level than in 2008, and could lead to a new phase of massive land acquisitions.

The 2008 land rush raises concern because foreign investors acquire land to export the agricultural production and thus reduce the local food supply. This decrease may threaten the food security of the locals. The detrimental effects could be particularly worrying for children.

Müller et al. (2021) did an empirical assessment of LSLAs on child nutrition, across African countries. However, due to data limitations, the methodology used is not the most appropriate one to find robust results. This study aims to extend the analysis with another approach.

Data

- **LandMatrix**, the most reliable database on LSLA, improved by myself with more than 150 new geolocations indexed (Figure 2). Only **non-extractive** LSLAs are included.
- **Demographic and Health Surveys**, provide information on children and their nutrition in many African countries.
- Geospatial and macroeconomic data (**GADM**, **Hansen**, **World Bank**...).
- **Baseline dataset**: 17,577 children, in 11 countries, close to 36 LSLAs, from 2005 to 2019.

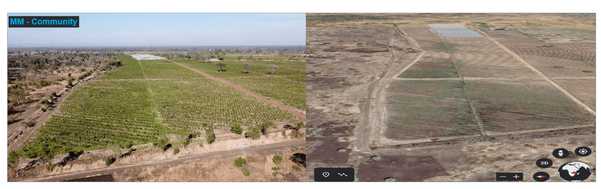


Figure 1: Example of an additional location.

Methodology

The improvement in the number of geolocated LSLAs makes it possible to estimate a ”canonical Diff-in-Diff". It is a comparison, before and after, between people affected by the LSLA (treated group) and the one not affected (control group).

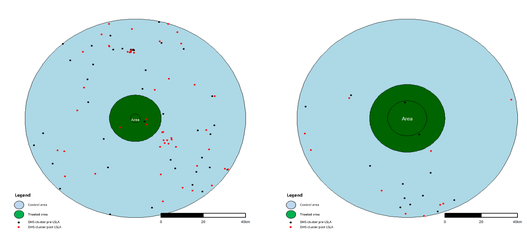


Figure 2: Methodology applied to two LSLAs.
Left: Included. Right: Rejected

Children affected, in the baseline estimation, are the ones at less than 10km (green area, in Figure 3) and people not affected are the ones at more than 10 but less than 50 (blue area).

The methodology requires to have affected and not affected, before (black dot) and after (red dot). Left example can be included, right example cannot (no red dot in green area).

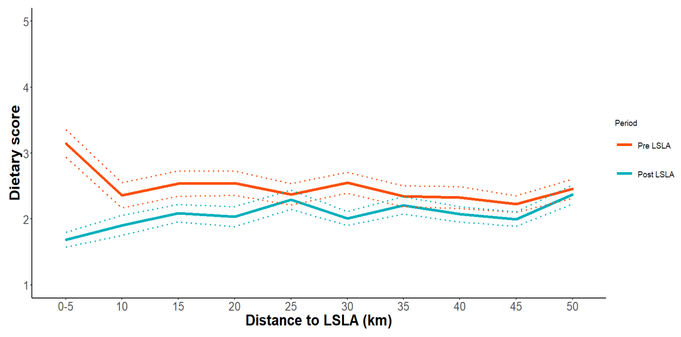
Estimated equation

$$Y_{i,b,j,t} = \alpha + \beta(LSLA_{i,b,j,t} \times Post_t) + \delta X_{i,b,j,t} + \gamma Z_{j,t-1} + \mu_b + \eta_t + \zeta_g + \epsilon_{i,b,j,t}$$

$Y_{i,b,j,t}$, the dietary diversity score of the children. Number of food groups, eaten the last 24h.
$LSLA_{i,b,j,t}$, binary, 1 if the child is located at less than 10km to LSLA, 0 if between 10 and 50km.
$Post_t$, binary, 0 if the year is before the LSLA, 1 otherwise.
$X_{i,b,j,t}$, $Z_{j,t-1}$, respectively a set of characteristics variables on the household and the country.
μ_b, η_t, ζ_g, respectively buffer, year and administrative area fixed effects.

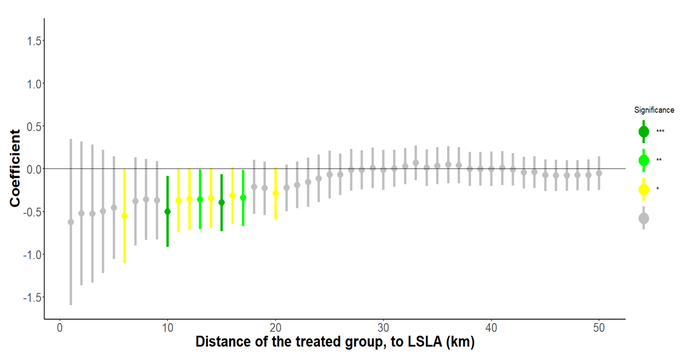
Results: The closer, the worst

Figure 4 shows **the average** dietary diversity score by groups of distance before and after the LSLAs. Children closest to the LSLAs observe a drop in their dietary diversity contrary to farther one.



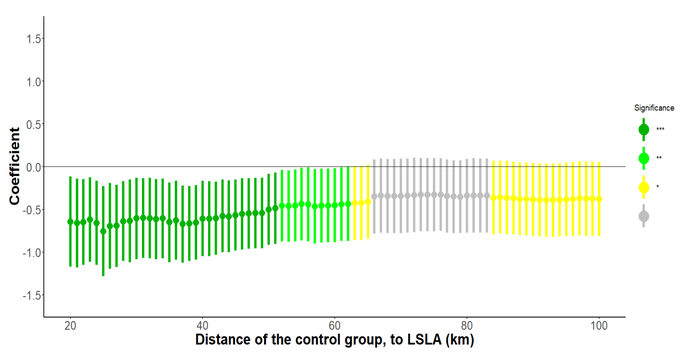
Simple averages, before and after.

Figure 5 shows the coefficients and confidence intervals of estimating the equation for different distance cutoff for the **treated group**. The x-axis indicates the treated distance (up to which kilometer individuals are considered as affected). The control group corresponds to the individual located at 40km of the treated distance. For the baseline estimation, the treated group is located at 10km and the control group at 10+40, so 50km. Coefficients in dark green indicate a 0.99 level of significance, green a 0.95, yellow 0.9, and grey is not significant.



Estimation by varying treated distance.

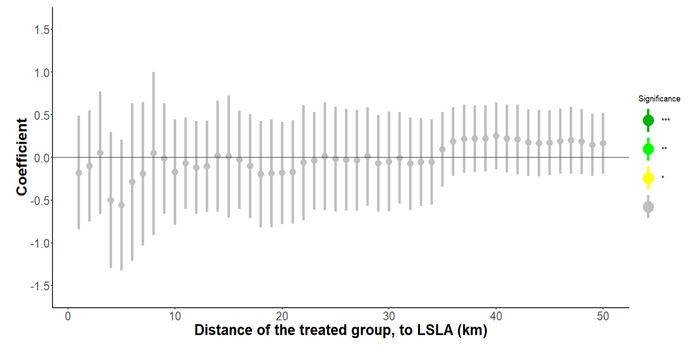
Figure 6 shows the coefficients and confidence intervals of estimating the equation for different distance cutoff for the **control group**. The treated distance is 10km.



Estimation by varying control distance.

Robustness

- **Extractive** Estimating a similar equation with only the extractive LSLAs (Mining, oil/gas) shows no effect on dietary diversity (Figure 7). It is a **simple placebo test**, as extractive locations are far from being exhaustive in LandMatrix database. However, it reinforces the hypothesis that it is the acquisitions of land suitable for food production that endangers food security.



Estimation by varying treated distance (Extractive LSLA).

- **Sample dependencies** The results are not dependent on a specific deal, a specific country, and are robust to sample changes (only boy/girl, close to multiple LSLA/to one LSLA...).
- **Migration** The similitude of household characteristics before and after the LSLAs makes it unlikely that the results are biased by positively or negatively self-selected migrants.

Conclusion

This study contributes to the literature of the effects of LSLA on households. The results of a ”Diff-in-Diff" estimation, using distance as a channel of transmission, show that LSLAs have a negative effect on children’s dietary diversity.
This result is consistent with the one found by Müller et al (2021) but also, with Anti (2021) which shows, in Cambodia, that LSLAs decrease food spendings.
This study analyses only the consequence of LSLAs in a reduced number of African countries, and over a short term. Whether these results hold for other countries, different continents, or in the long run is beyond the scope of this study. In long term, the effect of the LSLAs could be positive for the economic development and agricultural productivity of the targeted countries which could end to a global improvement in nutrition status.
However, the findings are that LSLAs have negative effects on the food security of neighboring communities. Those externalities must be taken into account and the private price should incorporate the social cost of LSLAs.

References

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