Can Land and Food Entitlement Reduce Conflict: Evidence from Violence Prone Eastern DR Congo

Naureen Fatema
PhD Candidate,
McGill University
Email: naureen.fatema@mail.mcgill.ca

Shahriar Kibriya
Center on conflict and development
Email: shahriar@tamu.edu

Department of Economics
McGill University
Leacock Building, Room 414
855 Sherbrooke Street West
Montreal, Quebec, H3A 2T7

Tel.: 514-398-3030
Fax: 514-398-4938


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Naureen Fatema
naureen.fatema@mail.mcgill.ca

Shabirah R Kibirya
shabirah@tamu.edu

**Abstract**

Entitlement of land and food is often identified as primary drivers of conflict and instability. In this study, we attempt to investigate whether property entitlement and access to food can reduce individual conflict in a violence prone impoverished society. We use survey data from 1496 households of North Kivu, Democratic Republic of Congo. Employing propensity score matching based quasi-experimental design, we show that both land claims and access to food can reduce the level of conflict in the surveyed households.

**Results from OLS and Doubly Robust Estimation (DRE)**

<table>
<thead>
<tr>
<th>Dependent Variable: OLS Land</th>
<th>OLS Food</th>
<th>DRE Land</th>
<th>DRE Food</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land Entitlement (T=1 if entitlement, or 0 otherwise)</td>
<td>(0.129^{**})</td>
<td>(0.078^{**})</td>
<td>(0.127^{**})</td>
</tr>
<tr>
<td>Food Security</td>
<td>(0.028^{*})</td>
<td>(0.026^{*})</td>
<td>(0.027^{*})</td>
</tr>
<tr>
<td>Housing Size</td>
<td>(0.060^{**})</td>
<td>(0.053^{**})</td>
<td>(0.060^{**})</td>
</tr>
<tr>
<td>Income</td>
<td>(-0.260^{**})</td>
<td>(-0.260^{**})</td>
<td>(-0.113^{**})</td>
</tr>
<tr>
<td>Education</td>
<td>(-0.040)</td>
<td>(-0.059)</td>
<td>(-0.040)</td>
</tr>
<tr>
<td>Fear of Exploitation</td>
<td>(0.124^{**})</td>
<td>(0.124^{**})</td>
<td>(0.123^{**})</td>
</tr>
<tr>
<td>Secure Transfer Rights</td>
<td>(-0.013)</td>
<td>(-0.016)</td>
<td>(-0.009)</td>
</tr>
<tr>
<td>Social Cohesion</td>
<td>(-0.028)</td>
<td>(-0.040)</td>
<td>(-0.027)</td>
</tr>
<tr>
<td>Cooperative Membership</td>
<td>(-0.001)</td>
<td>(-0.001)</td>
<td>(-0.001)</td>
</tr>
<tr>
<td>Constant</td>
<td>(0.060)</td>
<td>(0.060)</td>
<td>(0.060)</td>
</tr>
<tr>
<td>Observations</td>
<td>1,494</td>
<td>1,494</td>
<td>1,494</td>
</tr>
<tr>
<td>R-squared</td>
<td>0.188</td>
<td>0.188</td>
<td>0.188</td>
</tr>
</tbody>
</table>

**Table 1**

**Visual Representation of Matching Quality**

**Conclusion**

Based on our estimation, we conclude that households that have secure land entitlements and households that are food secure face lesser conflict in society compared to other similar households who differ only in their land and food entitlement respectively. By employing a variety of Propensity Score matching techniques, we hope to overcome the bias that may have occurred from households that may have been self-selected into receiving entitlement. PSM helps to match and compare households that had a similar background, similar time of conflict, and similar economic characteristics.

A policy implication of this may be that ensuring land and food entitlement to impoverished households in regions threatened by persistent war and social conflict may be effective in reducing conflict in these regions.

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**Estimation Procedure**

1. An RCT would have been ideal but would difficult to employ and unethical, so we use a quasi-experimental design.
2. We use two econometric approaches: nearest neighborhood propensity score matching and the doubly robust estimator.
3. We validate the quality, unconfoundedness and overlapping assumptions of our matching estimates.

- Propensity score is the probability of a unit (households in this study) being assigned to a particular treatment (i.e., having land entitlement and food security) given a set of observed covariates (Rosenbaum and Rubin, 1983).
- Propensity scores are used to reduce selection bias by equating groups based on these covariates. Suppose that we have a binary treatment \(X=1\) if entitlement, or 0 otherwise, and background variables \(X\) (Rosenbaum, P. R., & Rubin, D. B., 1983).
- Propensity score is defined as the conditional probability to treatment given background variables:

\[
P(x) = Pr(T = 1 | x) = \frac{e^{x'}}{1 + e^{x'}}
\]