Supplemental Appendix A:

Supporting Information for "Droughts, Land Appropriation, and Rebel Violence in The Developing World"

Contents

This supplemental appendix proceeds in seven parts. In the section immediately below, we present the corresponding proofs to our game-theoretic model. The second section then provides detailed anecdotal evidence of the causal mechanisms discussed within our formal model for the following four cases: India, Thailand, Somalia, and Peru. In the third section, we fully discuss and assess our micro-level evidence for the effects of drought$_t$ on (i) expropriation$_t$ and (ii) civilian deaths$_t$ within the India (district-year) and Thailand (province-year) samples that were referenced within our main paper. In addition to summarizing these country-specific data, models, and results, we further plot the districts and provinces included within our respective Thailand and India samples, and present summary statistics (including figures and tables) and robustness models for the expropriation$_t$ dependent variable. The latter robustness models demonstrate that our findings for the positive effects of drought$_t$ on expropriation$_t$ (in both the India and Thailand analyses) are generally robust to an alternative estimation strategy that employs a penalized maximum likelihood logistic regression in place of the probit models reported in the main paper.

In the fourth section, we report a variety of graphical and tabular summary statistics for our global developing country grid-cell-year sample's atrocities$_t$ dependent variable, drought$_t$ independent variable, and control variables. Next, we provide the full robustness model estimates for the global sample's alternative model specifications discussed in the main paper. This is followed by a fifth section, which provides a collection of additional anecdotal evidence pertaining to the various causal mechanisms discussed in the main paper's theory section.

In the sixth section below, we first list in Table **A.9** the 58 districts (2002-09) and 7 states that constitute the India district-year sample. We then list the primary and secondary data sources employed to operationalize the following dependent and independent variables for the India district-year sample: *expropriation*, *civilians killed* and *severe drought*. This is followed by Table **A.10**, which describes the operationalization of the dependent, independent and control variables for the India sample and lists the sources used for operationalizing the controls in this sample. The seventh part to our supplemental appendix first reports in Table **A.11** the 18 provinces (2004-2010) that comprise the Thailand province-year sample. We then list the primary and secondary data sources used to operationalize the following dependent and indepen-

dent variables for the Thailand province-year sample: *land expropriation*, *civilians death* and *harsh drought*. Table **A.12** then describes the operationalization of the dependent, independent and control variables for the Thailand sample and lists the sources used for operationalizing the controls in this sample.

I. Proofs

Proof of Lemma 1: From equation (1) in the text, the rebel group r's optimization problem is to maximize $f_r - c_r(a + \frac{1}{2}\theta b^2) + (1-p)[s(1-\phi)\pi(L,b,K)]$ – where $\pi(L,b,K) = \gamma(\alpha L^\rho + (1-\alpha)b^\rho + \beta K^\rho)^{\frac{1}{\rho}}$– with respect to a subject to $c_r(a + \frac{1}{2}\theta b^2) \leq f_r$ (this constraint means that it is feasible for r to commit atrocities against b only if their total costs of doing so is lesser than f_r; it is also equivalent to $f_r \leq \frac{c_r}{(a+\frac{1}{2}\theta b^2)}$). Since it is rational for r to commit a if and only if $c_r \leq s(1-\phi)\pi(L,b,K)$, the constraint $f_r \leq \frac{c_r}{(a+\frac{1}{2}\theta b^2)}$ is re-written as $f_r \leq \frac{c_r}{s(1-\phi)\pi(L,b,K)}$. Because $(1-p) = (1-\frac{m}{m+a})$, $r's$ optimization problem is fully defined as:

$$\begin{aligned} &\max_a \; f_r - c_r(a + \frac{1}{2}\theta b^2) + (1-\frac{m}{m+a})[s(1-\phi)\gamma(\alpha L^\rho + (1-\alpha)b^\rho + K^\rho)^{\frac{1}{\rho}}] \\ &\quad s.to.\; f_r \leq \frac{c_r}{s(1-\phi)\gamma(\alpha L^\rho + (1-\alpha)b^\rho + K^\rho)^{\frac{1}{\rho}}} \end{aligned} \tag{A.1}$$

$b's$ optimization problem is to maximize $f_b - mc_b + p[s(1-\phi)\pi(L,b,K)]$ with respect to m subject to $f_b \geq mc_b$(this constraint means that it is feasible for b to build a militia only if their costs of doing so is lesser than f_b). The constraint $f_b \geq mc_b$ is also defined as $f_b \geq \pi(L,b,K)$ as this condition rules out the possibility that $f_b < mc_b$. Since $p = \frac{m}{m+a}$, $b's$ optimization problem is therefore fully defined as

$$\max_m f_b - mc_b + \frac{m}{m+a}[s(1-\phi)\pi(L,b,K)] \;\; s.to. \;\; f_b \geq \pi(L,b,K) \tag{A.2}$$

From Equation A.1 and the complementary slackness condition, the optimal a is found with straightforward optimization: $\frac{\partial u_r}{\partial a} = \pi(L,b,K)(1-\phi)\left[\frac{\partial p}{\partial a}s - 1\right] = 0$ which is equivalent to $\frac{\partial u_r}{\partial a} = \gamma(\alpha L^\rho + (1-\alpha)b^\rho + K^\rho)^{\frac{1}{\rho}}(1-\phi)\left[\frac{\partial p}{\partial a}s - 1\right] = 0$. From the preceding expression and

given that $(1-p)=(1-\frac{m}{m+a})$ we obtain $a^*=\sqrt{\frac{m}{\phi}}s(\phi[(L+K)-\phi b]^2)-\frac{m}{\phi}$ for $m^*<\overline{m}$ and $a^*=0$ for $m^*\geq\overline{m}=\phi s((L+K)-\phi b)^2$. For $a^*>0$, $p=\frac{1}{(1+\frac{\phi a^*}{m})}$in equilibrium. From complementary slackness and (A1.2), the optimal m is found via straightforward optimization: $\frac{\partial u_b}{\partial m}=-(1-\phi)\pi(L,b,K)-\frac{\partial p}{\partial a}(1-\phi)s\pi(L,b,K)=0$ which given $p=\frac{1}{(1+\frac{\phi a^*}{m})}$ leads to $m^*=\frac{s(\phi[(L+K)-\phi b]^2)}{4a(1+\phi)}$ for $m^*<\overline{m}$ and $m^*=\phi s(\phi[(L+K)-\phi b]^2)$ for $m^*\geq\overline{m}$. $s>0$ in equilibrium if and only if $s(1-\phi)\pi(L,b,K)\geq f_r\ \forall\phi\in[0,1]$. Further, $s(1-\phi)\pi(L,b,K)>f_r$ which $\Rightarrow s(1-\phi)\gamma(\alpha L^\rho+(1-\alpha)b^\rho+\beta K^\rho)^{\frac{1}{\rho}}>f_r$ when $\phi<\overline{\phi}$ where $\overline{\phi}=\frac{\pi(L,b,K)-f_r}{\pi(L,b,K)}$. From $s(1-\phi)\pi(L,b,K)\geq f_r$, it follows that in equilibrium, the optimal $s^*=\frac{f_r}{(1-\phi)\pi(L,b,K)}=\frac{f_r}{(1-\phi)\gamma(\alpha L^\rho+(1-\alpha)b^\rho+\beta K^\rho)^{\frac{1}{\rho}}}$. The marginal productivity of the cropland with respect to the factors or production given ϕ is $(1-\phi)\pi(L,b,K)$. Hence the marginal productivity of the rural labor working on the cropland in equilibrium given ϕ is $(1-\phi)\frac{\partial\pi(L,b,K)}{\partial b}=(1-\phi)\left[\gamma(\alpha L^\rho+(1-\alpha)b^\rho+\beta K^\rho)^{\frac{1}{\rho}-1}\right](1-\alpha)b^{\rho-1}$.

Proof of Proposition 1: (i) From $s^*=\frac{f_r}{(1-\phi)\gamma(\alpha L^\rho+(1-\alpha)b^\rho+\beta K^\rho)^{\frac{1}{\rho}}}$, we find that $s^*>0$ for $\lim\phi\to 1$ and thus $\phi=1$. Additionally, $\frac{\partial s^*}{\partial\phi}=\frac{\pi(L,b,K)f_r}{[(1-\phi)\pi(L,b,K)]^2}>0$ for $\lim\phi\to 1$ and $\phi=1$. (ii) Substituting s^*in a^* in Lemma 1 leads to $a^*=\sqrt{\frac{w}{\phi}s^*}(\phi[(L+K)-\phi b]^2)-\frac{m}{\phi}$. For $s^*>0$ (which occurs when $\phi=1$) we get $\frac{\partial a^*}{\partial s^*}=\frac{\sqrt{m}/2\sqrt{s^*}}{\sqrt{\phi}}\phi[(L+K)-\phi b)]^2>0=(\sqrt{w}/2\sqrt{s^*})[(L+K)-b)]^2>0$ for $\phi=1$. When $a^*>0$, then the rebel's payoff from expropriation in equilibrium (given $(1-p)$) is $\Pi_r=\left(1-\frac{m^*}{m^*+a^*}\right)[(1-\phi)\pi(L,b,K)s^*]$. Note that $\Pi_r>0$ for $a^*>0$, $s^*>0$. In contrast, if r chooses to cooperate and share s^* with b, then $s^*<0$ or at most $s^*=0$. If $s^*=0$, then $\widehat{a}^*\leq 0$ for $\phi=1$. Let $\widehat{\Pi}_r=\left(1-\frac{m^*}{m^*+\widehat{a}^*}\right)[(1-\phi)\pi(L,b,K)s^*]$ be the rebel group's payoff from expropriation when $\widehat{a}^*\leq 0$. If $\widehat{a}^*\leq 0$ in equilibrium, then one can easily check that $\widehat{\Pi}_r\leq 0$. Because $\Pi_r>\widehat{\Pi}_r$, it follows that the rebel group's strictly dominant strategy is to expropriate when $\phi=1$, while not expropriating and co-operating with b is strictly dominated for $\phi=1$.

Proof of Claim 1: We need to show that $\pi_L<0$ for $\phi=1$ to prove this claim. From $(1-\phi)\pi(L,b,K)=(1-\phi)\gamma(\alpha L^\rho+(1-\alpha)b^\rho+\beta K^\rho)^{\frac{1}{\rho}}$, we get $\frac{\partial\pi}{\partial L}=(1-\phi)\left[\gamma(\alpha L^\rho+(1-\alpha)b^\rho+\beta K^\rho)^{\frac{1}{\rho}-1}\right]\alpha L^{\rho-1}$. Note that $(1-\phi)\left[\gamma(\alpha L^\rho+(1-\alpha)b^\rho+\beta K^\rho)^{\frac{1}{\rho}-1}\right]\alpha L^{\rho-1}<0$ for $\phi=1$ as claimed.

Proof of Claim 2: When the rebel group expropriates the cropland during a drought, they also (by default) fully confiscate the input factors of production; that is, they obtain $\pi(L,b,K) = \gamma(\alpha L^{\rho} + (1-\alpha)b^{\rho} + \beta K^{\rho})^{\frac{1}{\rho}}$ where $\pi(L,b,K) > 0$. When the rebel group "controls" $\pi(L,b,K)$, then from the equilibrium level of $s^* = \frac{f_r}{(1-\phi)\gamma(\alpha L^{\rho} + (1-\alpha)b^{\rho} + \beta K^{\rho})^{\frac{1}{\rho}}}$ in Lemma 1, $s^* > 0$ for $\phi = 1$ and $\pi(L,b,K) > 0$. For $s^* > 0$ and $\pi(L,b,K) > 0$, then for each rebel group member $u_r = f_r - c_r(a + \frac{1}{2}\theta b^2) + (1 - \frac{m}{m+a})[s^*(\pi(L,b,K))] > 0$. This implies that $s^* > 0$ can be credibly promised to the rebel group members when $\phi = 1$ only if the cropland is appropriated. Conversely, if the rebels do not appropriate the cropland, they will not (again by default) confiscate the input factors of production $\pi(L,b,K)$ which $\Longrightarrow \pi(L,b,K) = 0$. Consequently, $s^* \to 0$ when $\pi(L,b,K) = 0$ for $\phi = 1$. For $s^* \to 0$, $u_r = f_r - c_r(a + \frac{1}{2}\theta b^2)$ which means that $u_r \leq 0$ in this case since $f_r \leq c_r(a + \frac{1}{2}\theta b^2)$. Thus $s^* > 0$ cannot be credibly promised to the rebel group members when $\phi = 1$ when the cropland is not appropriated.

Proof of $\pi_b < 0$ and $\pi_{bb} < 0$ for $\phi = 1$— First note that from $c_r(a + \frac{1}{2}\theta b^2)$, it follows that $\frac{dc_r}{db} = \theta b > 0$. Define the function $q = (1-\phi)\pi_b$ where $\pi_b = \frac{\partial \pi(L,b,K)}{\partial b}$. From Lemma 1, $q = \pi_b = (1-\phi)\left[\gamma(\alpha L^{\rho} + (1-\alpha)b^{\rho} + \beta K^{\rho})^{\frac{1}{\rho}-1}\right](1-\alpha)b^{\rho-1}$ which, as stated earlier, is the marginal productivity of the rural labor working on the cropland. One can check that $(1-\phi)\left[\gamma(\alpha L^{\rho} + (1-\alpha)b^{\rho} + \beta K^{\rho})^{\frac{1}{\rho}-1}\right](1-\alpha)b^{\rho-1} < 0$ for $\phi = 1$ which $\Longrightarrow \pi_b < 0$ for $\phi = 1$. The aforementioned expression for $q = \pi_b$ can also be written as $\pi_b = \frac{\partial q}{\partial b} = (1-\phi)\frac{q}{b}\Delta_b$ where $\Delta_b = \frac{(1-\alpha)L^{\rho}}{\alpha L^{\rho} + (1-\alpha)b^{\rho} + \beta K^{\rho}}$. We need to check the sign of $\pi_{bb} = \frac{\partial \pi^2(L,b,K)}{\partial b^2}$ to complete the proof. Deriving the sign of π_{bb} reveals that

$$\pi_{bb} = (1-\phi)\left[\frac{q}{b}\Delta_b b^{-2}\right][(1-\rho)\Delta_b + (\rho - 1)] \tag{A.3}$$

In Equation A.3, $\left[\frac{q}{b}\Delta_b b^{-2}\right] > 0$ while $[(1-\rho)\Delta_b + (\rho-1)] < 0$ and $0 < \Delta_b < 1$. Hence for $0 < \Delta_b < 1$ and $\rho < 1$, it follows that $\pi_{bb} < 0 \; \forall b \in \Re_+$ and $\lim \phi \to 1$, $\phi = 1$ as claimed.

Proof of rebels' returns from the factor input of these workers is negative while costs of maintaining these workers is strictly positive when $\phi = 1$: If the rebels "co-operate" with the rural civilian labor and thus keep the civilian labor on the cropland post-expropriation, then they will account for the marginal productivity (that determines the marginal returns) from

this labor and marginal costs of maintaining these civilian workers. Hence from u_r, we can define the rebels' net utility $\overline{u}_r$ from keeping the labor force on the cropland in equilibrium as $\overline{u}_r = f_r - c_r a^* - \frac{dc_r}{db} + (1 - \frac{m^*}{m^*+a^*})\pi_b$ where $\pi_b = (1-\phi)\left[\gamma(\alpha L^\rho + (1-\alpha)b^\rho + \beta K^\rho)^{\frac{1}{\rho}-1}\right]$ $(1-\alpha)b^{\rho-1}$. Substituting $(1-\phi)\pi_b$ and $\frac{dc_r}{db} = \theta b > 0$ for $\theta > 0$ in $\overline{u}_r$ leads to

$$\begin{aligned}\overline{u}_r =& f_r - c_r(a^* + \theta b) + (1 - \frac{m^*}{m^*+a^*}) \\ & [s^*(1-\phi)\left[\gamma(\alpha L^\rho + (1-\alpha)b^\rho + \beta K^\rho)^{\frac{1}{\rho}-1}\right](1-\alpha)b^{\rho-1}] \end{aligned} \tag{A.4}$$

where $(1 - \frac{m^*}{m^*+a^*})[s^*(1-\phi)\left[\gamma(\alpha L^\rho + (1-\alpha)b^\rho + \beta K^\rho)^{\frac{1}{\rho}-1}\right](1-\alpha)b^{\rho-1}] = 0$ for $\phi = 1$ and by construction $f_r - c_r a^* - c_r\theta b < 0$. Hence $\overline{u}_r < 0$ since $(1-\phi)\pi_b < 0$ and $\frac{dc_r}{db} = \theta b > 0$ when $\phi = 1$ which implies that co-opting or capturing and using the rural civilian labor for agricultural production is strictly dominated for r.

Proof of $\frac{\partial s^*}{\partial b} < 0$ for $\phi = 1$: Recall from Lemma 1 that $s^* = \frac{f_r}{(1-\phi)\pi(L,b,K)} = \frac{f_r}{(1-\phi)\gamma(\alpha L^\rho + (1-\alpha)b^\rho + K^\rho)^{\frac{1}{\rho}}}$ and that $(1-\phi)\frac{\partial \pi(L,b,K)}{\partial b} = (1-\phi)\left[\gamma(\alpha L^\rho + (1-\alpha)b^\rho + K^\rho)^{\frac{1}{\rho}-1}\right](1-\alpha)b^{\rho-1}$. Hence $\frac{\partial s^*}{\partial b} = \frac{-f_r\left[(1-\phi)\gamma(\alpha L^\rho + (1-\alpha)b^\rho + K^\rho)^{\frac{1}{\rho}-1}(1-\alpha)b^{\rho-1}\right]}{\left((1-\phi)\gamma(\alpha L^\rho + (1-\alpha)b^\rho + K^\rho)^{\frac{1}{\rho}}\right)^2} < 0$ for $\lim\phi \to 1$, $\phi = 1$.

Proof of $s^* > 0$ for $b \to 0$ when $\phi = 1$: If $b \to 0$, then $s^* = \frac{f_r}{(1-\phi)\gamma(\alpha L^\rho + K^\rho)^{\frac{1}{\rho}}}$. From this expression, we find that $s^* > 0$ when $\phi = 1$. Hence $s^* > 0$ for $b \to 0$ when $\phi = 1$. For $s^* > 0$ and $b \to 0$, $\frac{\partial u_r}{\partial s^*} = (1 - \frac{m}{m+a})[(1-\phi)\gamma(\alpha L^\rho + \beta K^\rho)]^{\frac{1}{\rho}}$. Because $(1 - \frac{m}{m+a})[(1-\phi)\gamma(\alpha L^\rho + \beta K^\rho)]^{\frac{1}{\rho}} > 0$, it follows that $\frac{\partial u_r}{\partial s^*} > 0$ for $s^* > 0$ and $b \to 0$ when $\phi = 1$. Conversely, if $b > 0$ for $\phi = 1$, then $\frac{\partial s^*}{\partial b} < 0$ (see proof of claim 5). In other words, s^* strictly decreases for $b > 0$ when $\phi = 1$. s^* strictly decreasing $\Longrightarrow s^* \to 0$. When $s^* \to 0$, then $\underline{u_r} = f_r - c_r(a + \frac{1}{2}\theta b^2) \leq 0$ since $f_r \leq c_r(a + \frac{1}{2}\theta b^2)$. Hence $\frac{\partial u_r}{\partial s^*} > \underline{u_r}$ which means that the rebels have no incentives to share the stockpiled food with (but will rationally deprive) the rural civilian labor in the appropriated cropland during a drought. This $\Longrightarrow s^* \to 0$ for b when $\phi = 1$.

Proof of b will not co-operate (or join) r but with form $m > 0$: From the previous proof, $s^* \to 0$ for b when r expropriates the cropland during $\phi = 1$. Hence if the rural civilian labor "co-operates" with r when $s^* \to 0$ for b, then from $u_b = f_b - mc_b + p[s^*(1-\phi)\pi(L,b,K)]$ it

follows that $\overline{u}_b = f_b - mc_b$. Suppose that the civilian workers invest in developing m to prevent confiscation of L from r. This increases the possibility of $s^* > 0$ for b when $\phi = 1$. Then $m > 0$ and from $p = \frac{m}{m+a}$, we obtain $\frac{\partial p}{\partial m} > 0$; substituting $\frac{\partial p}{\partial m}$ in u_b leads to $\widehat{u}_b = f_b - mc_b + \frac{\partial p}{\partial m}[s^*(1-\phi)\pi(L,b,K)]$. Since $[s^*(1-\phi)\pi(L,b,K)] > 0$ for $s^* > 0$ and $\frac{\partial p}{\partial m} > 0$, it follows that $\widehat{u}_b > \overline{u}_b$. This $\Rightarrow \widehat{u}_b - \overline{u}_b > 0$ which in turn means that $m > 0$ is a strictly dominant strategy – while co-operating with r is strictly dominated by $m > 0$ – for the rural civilian workers when $\phi = 1$.

Proof of r keeping b on L being risky: If the finite set of the civilian labor b work on the rebel-confiscated cropland, then for $\phi = 1$ – and expropriation by r – it is plausible that m (where $m \subseteq b$) strictly increases, that is $m > 0$ (as shown in proof of claim 7). Let μ be the probability with which the civilian labor b (who work on the expropriated cropland) use their militia to oppose r. To maintain consistency with the model, μ is defined as the contest success function $\mu = p = \frac{m}{m+a}$. Thus $1-\mu$ (the probability with which the rebels' hold onto the confiscated cropland) is $1-\mu = 1 - \frac{m}{m+a}$. If $m > 0$, $\frac{\partial \mu}{\partial m} = \frac{a}{(m+a)^2} > 0$ and $u_b > 0$ for $\frac{\partial \mu}{\partial m} > 0$. Conversely, for $m > 0$ $\frac{\partial(1-\mu)}{\partial m} = -\frac{a}{(m+a)^2} < 0$ and $u_r < 0$ for $\frac{\partial(1-\mu)}{\partial m} < 0$. Thus it is highly risky for r to keep b on L as this weakens the rebels' ability to control L as $m > 0$ for b when $\phi = 1$

Proof of Proposition 2: (i) $a^* = \sqrt{\frac{m}{\phi}s^*}(\phi[(L+K) - \phi b)]^2) - \frac{m^*}{\phi}$ for $m^* < \overline{m}$ and $s = s^*$. $\frac{\partial a^*}{\partial \phi} = \sqrt{m^* s^*}\left(\frac{1}{\phi^2}\right) + \sqrt{\frac{m^*}{s^*}}[(L+K)^2 + b(b-4\phi)] + \frac{m^*}{\phi^2}$. Hence $\frac{\partial a^*}{\partial \phi} > 0$ for $\lim \phi \to 1$ and $\phi = 1$iff $b \geq 2$. Also $\frac{\partial m^*}{\partial a} = \frac{4a(1+\phi)[-2s\phi((L+K)-\phi b)] - 2s[\phi((L+K)-\phi b)^2]}{[4a(1+\phi)]^2} < 0$ for $\phi = 1$ and $\frac{\partial m^*}{\partial \phi} = \frac{-s4a}{[4a(1+\phi)]^2} < 0$ for $\lim \phi \to 1$, $\phi = 1$. (ii) $(1-p) = (1 - \frac{m}{m+a}) = (1 - \frac{m^*}{m^*+a^*})$. $\frac{\partial(1-p)}{\partial a^*} = 1 + \frac{m^*}{(m^*+a^*)^2} > 0$ and from part (i) of this proposition $a^* > 0$ for $\phi = 1$. Thus $\frac{\partial(1-p)}{\partial a^*} > 0$ for $a^* > 0$ and $\phi = 1$. Further, in equilibrium $p = \frac{1}{(1+\frac{\phi a^*}{m})} > 0$ (see Lemma 1). Hence $(1-p) = 1 - \frac{1}{(1+\frac{\phi a^*}{m})}$. $\frac{\partial(1-p)}{\partial a^*} = \frac{\frac{\phi}{m^2}}{(1+\frac{\phi a^*}{m})^2}$ for $\lim \phi \to 1$ and $\phi = 1$.

Proof of keeping b on L is strictly dominated for r by tacic of evicting and killing b when $\phi = 1$: Recall from the proof of **claim 4** that $\overline{u}_r < 0$ as $(1-\phi)\pi_b < 0$ and $\frac{dc_r}{db} = \theta b > 0$ when $\phi = 1$.When $a^* > 0$ for $\phi = 1$ (see proof of Proposition 2) then by construction $b \to 0$. For $b \to 0$, we obtain

$$\widehat{u}_r = f_r - c_r a^* + (1 - \frac{m^*}{m^* + a^*})[s^*(1-\phi)\pi(L,K)] \tag{A.5}$$

If the rebels simply use land as the factor input for production for $b \to 0$, then $\widehat{u}_r = f_r - c_r a^* +$

$(1-\frac{m^*}{m^*+a^*})[s^*(1-\phi)\left[\gamma(\alpha L^\rho+\beta K^\rho)^{\frac{1}{\rho}-1}\right]\alpha L^{\rho-1}$(furthermore $\frac{\pi_L}{\pi_b}=\frac{\left[\gamma(\alpha L^\rho+(1-\alpha)b^\rho+\beta K^\rho)^{\frac{1}{\rho}-1}\right]\alpha L^{\rho-1}}{\left[\gamma(\alpha L^\rho+(1-\alpha)b^\rho+\beta K^\rho)^{\frac{1}{\rho}-1}\right](1-\alpha)b^{\rho-1}}$ >0 and Likewise, $\frac{\pi_K}{\pi_b}=\frac{\left[\gamma(\alpha L^\rho+(1-\alpha)b^\rho+\beta K^\rho)^{\frac{1}{\rho}-1}\right]\beta K^{\rho-1}}{\left[\gamma(\alpha L^\rho+(1-\alpha)b^\rho+\beta K^\rho)^{\frac{1}{\rho}-1}\right](1-\alpha)b^{\rho-1}}>0$ for $\rho\geq 1$ and $0<\rho<1$). Importantly, one can check that $(1-\frac{m^*}{m^*+a^*})[s^*(1-\phi)\left[\gamma(\alpha L^\rho+\beta K^\rho)^{\frac{1}{\rho}-1}\right]\alpha L^{\rho-1}\to 0$ for $\phi=1$. But $f_r\geq c_r a^*$ since $c_r(a+\frac{1}{2}\theta b^2)\leq f_r \Longrightarrow f_r\geq c_r a^*$. Hence $\widehat{u}_r>0$ when $\phi=1$. Hence, $f_r-c_r a^*-c_r\theta b+(1-\frac{m^*}{m^*+a^*})[s^*(1-\phi)\pi(L,K)]<f_r-c_r a^*+(1-\frac{m^*}{m^*+a^*})[s^*(1-\phi)\pi(L,b,K)]$ for $\lim\phi\to 1$ and $\phi=1$. This $\Longrightarrow \overline{u}_r-\widehat{u}_r<0$ for $\phi=1$ while $\overline{u}_r<0$ for $\phi=1$. Thus $\overline{u}_r-\widehat{u}_r<0$ when $\phi=1$ which implies that $a^*>0$ is a strictly dominant strategy – while co-operating (co-opting) or forcing the civilian labor to work as bonded labor on the cropland is strictly dominated by $a^*>0$ – for the rebel group.

Proof of the rebels' net utility from committing atrocities is higher than their benefits from keeping the workers on L when when $\phi=1$: Follows directly from the previous proof.

CES production function properties (brief)

- More formally, $\rho\leq 1$ is the (constant) elasticity of substitution which is $\sigma=\frac{1}{1-\rho}$. The CES production function is a more general production function that (depending on the values of ρ and σ) incorporates the Cobb-Douglas production function, the Leontief production function, and the linear production function. The CES production function $\pi(L,b,K)$ and variants of this production function have been used by various economists including Arrow et al (1961) and Nehru and Dhareshwar (1993) to study crop production in croplands of developing countries.

- Without loss of generality, we assume constant returns to scale for the CES production function $\pi(L,b,K)$. The model's equilibrium and comparative static results do not alter when we (i) assume increasing or decreasing returns to scale (results from increasing and decreasing returns to scale are available on request), (ii) focus on just cropland L and labor b as inputs in the production function (results from the CES production function for just these two inputs are briefly shown below) and (iii) employ different functional forms for $\pi(L,b,K)$ (results from this exercise are also briefly shown below).

Results with other CES production functions

Example 1: Two input factors of production — Land L and Labor b. The CES production function in this case is $\pi(L,b) = \gamma(\alpha L^{\rho} + (1-\alpha)b^{\rho})^{\frac{1}{\rho}}$. Using this two-input factor CES production function leads to

$$a^* = \sqrt{\frac{m}{\phi}}s(\phi[(L-\phi b]^2) - \frac{m}{\phi} \text{ for } m^* < \overline{m} \tag{A.6}$$

$$s^* = \frac{f_r}{\gamma(\alpha L^{\rho} + (1-\alpha)b^{\rho})^{\frac{1}{\rho}}} \tag{A.7}$$

Finally, the marginal productivity of the rural labor working on the cropland in equilibrium given ϕ in this two-input factor case is $(1-\phi)\frac{\partial \pi(L,b,K)}{\partial b} = (1-\phi)\left[\gamma(\alpha L^{\rho} + (1-\alpha)b^{\rho})^{\frac{1}{\rho}-1}\right]$ $(1-\alpha)b^{\rho-1}$. The detailed derivation of these results are available on request. Further, the comparative static results shown above in Propositions 1 and 2 and the additional results in claims 1-8 also hold for $\pi(L,b) = \gamma(\alpha L^{\rho} + (1-\alpha)b^{\rho})^{\frac{1}{\rho}}$ (these results are available on request as well).

Example 2: Three input factors of production — Land L, Labor b and Capital K. But with the following three-input CES production function $\pi(L,b,K) = [\gamma(\alpha L^{\rho} + \beta K^{\rho} + (1-\alpha-\beta)b^{\rho}]^{\frac{1}{\rho}}$. Using this three-input factor CES production function leads to

$$a^* = \sqrt{\frac{m}{\phi}}sH(.)(\phi[(L+K-\phi b)]^2) - \frac{m}{\phi} \text{ for } m^* < \overline{m} \tag{A.8}$$

$$s^* = \frac{f_r}{H(.)[\gamma(\alpha L^{\rho} + \beta K^{\rho} + (1-\alpha-\beta)b^{\rho}]^{\frac{1}{\rho}}} \tag{A.9}$$

where $H(.) = [\gamma(\alpha(\sigma)L^{\rho} + \beta(\sigma)K^{\rho} + (1-\alpha(\sigma)-\beta(\sigma))b^{\rho}]$.The marginal productivity of the rural labor working on the cropland in equilibrium given ϕ in this three-input factor case is $(1-\phi)\frac{\partial \pi(L,b,K)}{\partial b} = (1-\phi)\left[H(.)^{\frac{1}{\rho}-1}\gamma(\alpha L^{\rho} + \beta K^{\rho} + (1-\alpha-\beta)b^{\rho})^{\rho-1}\right]$. The detailed derivation of these results are available on request. Additionally, the comparative static results shown above in Propositions 1 and 2 and the additional results in claims 1-8 do not alter for

$\pi(L,b,K) = [\gamma(\alpha L^{\rho} + \beta K^{\rho} + (1-\alpha-\beta)b^{\rho}]^{\frac{1}{\rho}}$ (these results are also available on request).

II. Detailed Anecdotal Evidence

The anecdotal evidence corresponding to Bastar and Dantewada (India) and Songkhla (Thailand) in our main paper's theoretical section is described in more substantial detail below. This is followed by a relatively brief discussion of the Somalia and Peru examples.

India Example

Consider the case of Bastar and Dantewada — agricultural districts in the state of Chattisgarh, India in which predominantly rice is cultivated — where anti-government Naxalite rebel groups actively operate (Singh, 2006; Sundar, 2007; Pandita, 2011). When Bastar and Dantewada were afflicted by a severe drought in 2004 (and early 2005), villagers in these two districts stored higher quantities of the rice they produced for future consumption (Sundar, 2007) and also "kept the accumulated rice in numerous anaj ghars located on their rice fields."[1] As predicted by our theory, this induced the Naxalite rebels to seek to forcibly expropriate the villagers' rice fields to capture these rice stockpiles (thus avoiding transportation costs), and ensure a steady supply of food given uncertainty created by the drought (Gregory, 2013; Sundar, 2007, 287). In fact, apart from newspaper and magazine articles that reported how the 2004-05 drought influenced the Naxalites to move toward "capturing the farmers' rice fields and collected rice to obtain food,"[2] a report by the Ministry of Home Affairs (Government of India) also suggested that...

> "The long-lasting drought of 2004 led to a situation where the Naxalites had little choice but to make a concerted decision to usurp the rice lands of rural farmers in Bastar and Dantewada...this was a necessary tactic for the Naxalites to help them get enough food for sustenance, and to feed the rank and file of their group..."[3]

[1] Singh (2006, 71). Also see Sundar (2007).

[2] "Chhattisgarh orders ban on Naxals," *The Asian Age*, 6 September 2005, pp.B.3; also see "War Against Naxals that Backfired," *The Times of India*, September 24, 2005 and "Maoist shadow over Chhattisgarh," *The Times of India*, 16 May 2005.

[3] Ministry of Home Affairs, *Annual Report* 2004-05 (Official Documents Section in the Library of the Central Secretariat-Shastri Bhawan), Government of India, New Delhi (2005: 39).

Historical evidence from Bastar and Dantewada reveals that the rural civilians working in the rice fields in these two districts did actively seek to build "self-help" militias to protect their rice fields from expropriation by the Naxalite rebels during the 2004-05 drought (Singh, 2006; Pandita, 2011). As suggested in Ministry of Tribal Affairs Report by the Indian government, the

> "...farmers and *adivasi* tribals residing in Bastar and Dantewada started organizing themselves and holding rallies during the onset of the severe drought in 2004 and later in 2005...the ostensible objective behind such organization was to facilitate the formation of self-defense groups that would be used to defend expropriation of agricultural land, property, houses and other assets by the Naxalites. These self-defense groups laid the foundation for the *Salwa Judum* militia mobilised by farmers and the *adivasis* in 2005."[4]

A series of books and newspaper articles from 2004-06 also pointed out that the farmers in Bastar and Dantewada organized and held public meetings in which they discussed the need to form militias to protect their rice fields and property from the "rampaging and violent Naxalites."[5]

Note that the Naxalite rebels perceived the meetings held by farmers in Bastar and Dantewada in attempts to organize defensive militias in 2004 as a threat to their twin goal of expropriating their (the farmers') rice fields and consuming the stockpiled rice in these fields (Singh, 2006; Shankar, 2006). They believed that once (and if) the farmers in these two districts formed self-defense militias, then it would make it "very difficult for the Naxals to get access to the peasants' rice fields and crops stored in anaj ghars, militarily challenge them and deprive the Naxals of desperately needed food for consumption"[6] (Pandita, 2011; Singh, 2006, 31-32). The Naxalite rebel leaders in Bastar also expressed their opinion to journalists in 2004 that the farmers would use their militias to militarily oppose them and thereby "weaken the Naxalite rebel

[4]"Background note on the Scheduled Tribes" (Recognition of Forest Rights Bill), 2005, Ministry of Tribal Affairs, New Delhi: Government of India, pp. 24; also see Sundar (2007); Singh (2006, 34-36).

[5]Singh (2006, 57). Also see "Taking on Maoists proving an uphill task," *The Pioneer*, 29 October 2004; "War in tribal heartland," *Indian Express*, 7 May 2006 and Shankar (2006, 37-38).

[6]*Ministry of Home Affairs*, "Status Paper on the Naxal Problem," 18 August 2004., Internal Security Division. Government of India, New Delhi, pp.11-12. Also, see "Naxalgarh: Rule of the outlaw," *The Times of India*, 27 May 2005; "Naxalism hits 30 crore people," *The Central Chronicle* 31 May 2005; Ramana (2008).

movement as a whole" (Ramana, 2008; Singh, 2006, 17).[7] Thus as emphasized in a report by the Government of India's Planning Commission, in the drought year of 2004, Naxalites operating in Bastar and Dantewada took the "critical decision of expelling the peasants and *adivasi* tribals from their farmlands"[8] so that the farmers could *not* credibly hinder their appropriation goals (Singh, 2006; Pandita, 2011). This strategic decision to expel the farmers from their rice fields was further bolstered by the Sangham (Naxalite) rebel group's view that evicting the farmers would ensure that the "Sangham group members can eat the rice stored in *anaj ghars* without sharing with farmers" (Singh, 2006, 19).[9] Indeed, keeping the farmers and their families on the rice fields was considered a *liability* by the Naxalites in Bastar as they would be (i) "forced to share limited food supplies with the farmers"[10] if the latter were retained in the croplands and the (ii) Sangham rebel group members' believed that owing to the drought the farmers would be an "unproductive workforce" that would not add much to crop production (Singh, 2006; Shankar, 2006; Pandita, 2011).

Anecdotal evidence from Bastar and Dantewada (districts in Chattisgarh, India) also bolster our theoretical claims about the link between severe droughts and rebel-perpetrated violence against civilians in croplands. To this end, first note that during the severe drought of 2004 in Bastar and Dantewada, Naxalites engaged in substantial violence against rural civilians residing in these two districts which resulted in the following outcome,

> "150,000 people have been displaced, approximately one-third of whom were officially living in camps as of February 2006; some 500 to 1000 people have been killed and over 3000 houses burnt" (Gregory, 2013, 18)

An actual witness of the Naxalite-perpetrated violence against rural civilians that occurred in Bastar in the context of the 2004 drought pointed out that,

> "Earlier they would sweet-talk us, promising to stop exploitation of *Adivasis*; they

[7] "Taking on Maoists proving an uphill task," *The Pioneer*, 29 October 2004; Ramana (2008); Gregory (2013).

[8] Planning Commission of India. 2008. *Development Challenges in Extremist Affected Areas: Report of an Expert Group.* New Delhi: Government of India. For more details on this see, Ray (2002); Singh (2006); Ramana (2008) and "War in tribal heartland," *The Indian Express*, 27 February 2006.

[9] Also see Ray (2002); Ramakrishnan (2010).

[10] Shankar (2006, 17); also see "Naxalites worried about villagers defense tactics," *Hitavada*, 12 October 2004; "Taking on Maoists proving an uphill task," *The Pioneer*, 29 October 2004; Singh (2006).

> said they would form the government...but once the rains failed in July and August of 2004, the Sangham (Naxalite) rebels started harassing and attacking us, taking our land, and even taking away our young girls. Then, they began to kill. They claim to hold *Jan Adalats*, peoples' court, before doling out punishments or execution orders, but I never saw one."[11]

Another farmer who was also a witness to Naxalite-led violence against civilians in Bastar in 2004-05 further confirmed that "Sangham (Naxalites) members armed with guns, choppers and spears attacked us and killed some of us."[12] And a report issued by India's Home Ministry in 2005 stated that "when the monsoon failed in 2004 in Chattisgarh over a thousand people were killed by the Naxals in Bastar alone, over 3000 houses have been burnt and stories of brutal gang rape by the Naxalites circulate as common knowledge."[13]

Further, an in-depth study of violence committed against farmers and tribals in Bastar and Dantewada in 2004 emphasizes that after the "outbreak of the devastating drought of 2004, group members from the Sangham (Naxalite) rebels regularly used violence in their treatment towards the locals. They burned down self sustaining villages to pursue their agenda of capturing rice field and the farmers living on the rice field paid direct costs — they were often sought out and killed indiscriminately by the rebels."[14]

Why did the Naxalites consistently carry out such indiscriminate acts of violence against farmers in Bastar and Dantewada during the 2004 drought? Detailed accounts of the interaction between the Sangham (Naxalite) rebels and rural civilians in the context of the 2004 drought in Bastar and Dantewada emphasize that the Naxalites

> "...indiscriminately killed farmers and *adivasis* living in Bastar and Dantewada in 2004 as a tactic to prevent consumption of limited food by rural residents...From

[11]Rao (2010, 351). Further, see "In Naxal Heartland," *The Hindu*, 10 April 2005; "Maoists kill villagers," *Hitavada*, 5 November 2004; Ramana (2008); "Extremists abduct, kill five villagers," *Hitavada*, 29 July 2005.

[12]BRao (2010, n. 11, p. 352). Also see Planning Commission of India, 2008, *Development Challenges in Extremist Affected Areas: Report of an Expert Group* (New Delhi: Government of India); "Naxalism hits 30 crore people," *The Central Chronicle* 31 May 2005; Singh (2006); Raja (2008).

[13]Ministry of Home Affairs, "Revisiting the Naxal Problem," 14 July 2005, Internal Security Division. Government of India, New Delhi, pp. 3. Also, see Singh (2006); Sundar (2007).

[14]Ministry of Home Affairs, "Status Paper on the Naxal Problem," 18 August 2004. Internal Security Division. Government of India, New Delhi, pp. 4-5. Additionally, see Ministry of Tribal Affairs, 2006, *National Tribal Policy: A Policy for the Scheduled Tribes of India* (New Delhi: Official Documents Section in the Library of the Central Secretariat (Shastri Bhawan); Shankar (2006); Raja (2008).

the Naxalite viewpoint, the lesser the local residents and farmers living on arable lands, the greater the amount of crops they could eat."[15]

The aforementioned view has been echoed by researchers[16] and the print media.[17] It has also been corroborated by the Home Ministry (Government of India) which posits that "killing farmers and *adivasis* in Bastar during droughts is a time-tested tactic that the Naxals use to get access to stored crops and food"[18] and moreover to "prevent others, including locals, from getting access to and consuming the food which is in short supply when the rains fail."[19]

Another complementary goal that the Naxalites hoped to achieve by massacring farmers and tribals in Bastar during the 2004 drought was to both send an observable signal of their intent to evict these farmers plus tribals from their arable land and generate fear among these residents (Shankar, 2006; Rao, 2010). As suggested in a recent study, the Naxalites indiscriminately killed civilians in Bastar and Dantewada during the 2004 drought to send "a very public and clear message to the *adivasis* and the local farmers"[20] that they would be "physically harmed if they did not voluntarily leave their rice fields...to allow the Naxals to use the fields"[21]—this in effect meant that the Naxals were strategically using acts of murder and brutalities against villagers to warn local farmers and tribals to *vacate* their farmland and leave their property behind (see, e.g., Shankar, 2006; Pandita, 2011).[22] Furthermore, the Government of India's Home Ministry pointed out that the Naxal-perpetrated atrocities against farmers in Bastar during the 2004 drought was intentionally carried out by Sangham (Naxalite) rebel group members "to generate fear and panic among the villagers...they were confident that this fear tactic produced by brutal killings, rape and house burning would force the villagers to run away from their rice

[15]Shankar (2006, 91); in addition, see "Taking on Maoists proving an uphill task," *The Pioneer*, 29 July 2004; "Maoist shadow over Chhattisgarh," *The Times of India*, 16 May 2005; Singh (2006); Raja (2008).

[16]See e.g., Singh (2006); Raja (2008); Ramana (2008); Rao (2010).

[17]"Maoists kill villagers," *The Hitavada*, 5 November 2004; "War in tribal heartland," *The Indian Express*, 27 February 2006; "Naxalgarh: Rule of the outlaw," *The Times of India*, 27 May 2005; "Naxalism hits 30 crore people," *The Central Chronicle* 31 May 2005.

[18]Ministry of Home Affairs, 18 August 2004, fn.14, pp.4. See also Ray (2002); Raja (2008); Ramana (2008).

[19]Ministry of Home Affairs, Ibid., pp.4. Further, see "Naxalgarh: Rule of the outlaw," *The Times of India*, 27 May 2005; "Maoists kill villagers," *The Hitavada*, 5 November 2004; Ramana (2008).

[20]Shankar (2006, 59). For more analysis of this issue see "Taking on Maoists proving an uphill task," *The Pioneer*, 29 October 2004; Singh (2006); Raja (2008).

[21]"Naxalites worried about villagers defense tactics," *Hitavada*, 12 October 2004, p.7; also see Ministry of Home Affairs, 18 August 2004, fn.14; Ramana (2008); Rao (2010).

[22]"Extremists abduct, kill five villagers," *Hitavada*, 29 July 2005, p.2. Also see "Naxalism hits 30 crore people," *The Central Chronicle* 31 May 2005; Singh (2006).

fields"[23] and hide in neighboring forests (Singh, 2006; Pandita, 2011).

Finally, as suggested in our formal model, Naxalite rebels in Bastar and Dantewada during the 2004 drought also fully recognized that killing and committing other acts of brutality against local farmers and tribals would produce a mass exodus and facilitate forcible eviction of these rural residents (Singh, 2006; Pandita, 2011). As such, this mass exodus would help the Naxalites to "capture the rice fields, obtain stored food for survival, and make it next to impossible for the farmers to build defence organizations that could contest"[24] their (the Naxals') land appropriation goals (Singh, 2006; Shankar, 2006; Rao, 2010; Gregory, 2013). Thus from the Naxalites' perspective, killing innocent civilians was "necessary to prevent the villages from arming themselves, and to force them to flee"[25] so that the Naxals can capture the farmers' food, houses and farmland (Singh, 2006; Shankar, 2006).

Thailand Example

For the second example, consider the province of Songkhla in Thailand — a crop-producing province in which rice is the predominant cultivated crop — where the anti-government rebel organization, the Barisan Revolusi Nasional-Coordinate (BRN-C), has operated for several years. During the intense drought of 2004 in Songkhla that lasted for several months, farmers working in the rice-producing areas of Rattaphum, Na Mom and Bang Klam in Songkhla province stored significant amounts of rice on their rice fields for consumption (Srirai, 2008; Ball and Mathieson, 2007; Rattanachaya, 2004, 47-48). As noted by numerous scholars, this action of storing rice influenced BRN-C rebels (sometimes known as *juwae* warriors) to actively seek to expropriate the farmers' rice fields to capture the latter's rice stocks for personal consumption and to facilitate a steady supply and distribution of crops to group members (see, e.g., Rattanachaya, 2004; Gunaratna, Acharya and Chua, 2005).[26] The BRN-C's goal of appropriating rice fields was also reported by the print media at the time which suggested that the accumulation and storing of rice by farmers in Songkhla during the 2004 drought "influenced

[23]Ministry of Home Affairs, 14 July 2005, fn.13, pp. 3. Also see Ramana (2008); Ramakrishnan (2010).

[24]Ministry of Tribal Affairs, May 2006, fn.14, p.6. Further, see Raja (2008); Rao (2010).

[25]"Naxalites worried about villagers defense tactics," *The Hitavada*, 12 October 2004, p.7; also see Singh (2006); Shankar (2006); Ramana (2008).

[26]Also see Srirai (2008); Helbardt (2011) and "Drought and competition for agricultural land" *The Nation*, September 29, 2004, p B1.

BRN-C to decide to raid and capture rice fields across Rattaphum, Na Mom and Bang Klam. This decision was motivated by their desperate need to acquire, distribute among group members and eat rice stored by farmers in these rice fields as well as other assorted fruit crops (from langsat, rambutan, and mangosteen) in the rural areas."[27]

But it was not merely the media who recognized that the BRN-C was interested to forcefully appropriate the rice fields and farmlands of rice producing peasants in Songkhla owing to the severe drought conditions that prevailed in 2004. Rather the rice producing farmers in Rattaphum, Na Mom and Bang Klam in Songkhla understood *and* anticipated during the 2004 drought that BRN-C rebels would make serious attempts to appropriate their rice fields (Janchitfah, 2004; Srirai, 2008). According to accounts in the print media (at the time) and extant research, these farmers thus "started talking among themselves to put together defense associations"[28] in August-September 2004 to defend their farmlands from appropriation by BRN-C which they fully anticipated (see, e.g., Janchitfah, 2004; Rattanachaya, 2004; Gunaratna, Acharya and Chua, 2005). One account in fact emphasized that villagers in Rattaphum and Na Mom believed that "village-based defense associations would help them to thwart and discourage BRN-C rebels from raiding"[29] their crops and rice fields (Chongkittavorn, 2004; Srirai, 2008).

Rebel group members from BRN-C were alarmed when they heard from reliable sources that the rice producing farmers in villages around Rattaphum and Na Mom in Songkhla would set up military-style organizations to defend their rice paddy fields (Gunaratna, Acharya and Chua, 2005; Helbardt, 2011). This is because they (i.e., BRN-C) viewed such self-defense militias that the farmers in Songkhla planned to organize as a "serious impediment to their goal of capturing and controlling rice fields in Rattaphum, Na Mom and Bang Klam"[30] that are situated in Songkhla. This impediment was of serious concern to the BRN-C rebel group during the severe 2004 drought as failure to control rice fields in Songkhla would "increase the

[27]"Separatist violence takes new turn in southern Thailand," *The Nation*, 24 June 2004, p.2. Also see (Srirai, 2008; Liow and Pathan, 2010).

[28]Chongkittavorn (2004, 17); also see "Peace stays far away in southern Thailand," *Asia Times*, 15 March 2006.

[29]"Villagers in Songkhla rely on militias for defense," *The Nation*, 17 March 2004, pp.4; "Defense Tactics by Farmers in Songkhla," *The Bangkok Post*, 2 April 2004; ICG 2005; Srirai (2008).

[30]"Food fights between BRN-C and Farmers in Songkhla" *The Nation*, 19 November 2004; pp.A-2. Also, see Janchitfah (2004); Rattanachaya (2004).

possibility of starvation of BRN-C members"[31] as they needed the farmers' stored rice in these fields for their basis sustenance (Janchitfah, 2004; Chongkittavorn, 2004).

The BRN-C, however, did not just view the residing farmers' efforts toward organizing a defense association as a threat to their expropriation goal. They also overtly opined during the severe drought of 2004 that it was "not feasible for them to share the stored rice on the paddy fields of Rattaphum, Na Mom and Bang Klam with residing villagers"[32] given the "limited amount of rice stockpiles."[33] And furthermore, they believed that the residing farmers in the rice producing villages of Songkhla province "would not be of much use to them given their diminished capacity to work because of water scarcity"[34] generated by the failed monsoon of 2004 (Janchitfah, 2004; McCargo and Pathmanand, 2005; Ball and Mathieson, 2007). In short, leaders from BRN-C viewed the continued presence of farmers in the rice fields of Songkhla province as a financial liability that they could dispense with (Rattanachaya, 2004; Ball and Mathieson, 2007; Aphornsuvan, 2007).

The BRN-C's view of working farmers in Songkhla as a financial liability during the 2004 drought combined with their perception of these farmers as a threat to their appropriation goals influenced them to take the decision to "expel peasants and families from the rice-fields of Rattaphum, Na Mom and Bang Klam"[35] which they sought to appropriate (Janchitfah, 2004; Srirai, 2008). After all, leaders from BRN-C considered the decision to evict farmers from the rice fields of villages in Songkhla in 2004 as a feasible tactic that would help them to "block the formation of defense associations by farmers"[36] in the villages of Songkhla, and facilitate expropriation of both rice fields plus stored grains in the farmlands of the province McCargo and Pathmanand (2005); Montesano and Jory (2008); Srirai (2008). Evicting the peasants from their villages was also an attractive economic option for the BRN-C rebels as it meant that they

[31] "BRN-C and the insurgency in Thai south," *Straits Times*, 25 September 2004, p.7. Further, see Chongkittavorn (2004); Davis (2005); Srirai (2008).

[32] "Food fights between BRN-C and Farmers in Songkhla," *The Nation*, 19 November 2004; pp.A-2. Additionally, see "BRN-C and the insurgency in Thai south," *Straits Times*, 25 September 2004; Chongkittavorn (2004); Aphornsuvan (2007).

[33] Srirai (2008, 15). Also see Rattanachaya (2004); Aphornsuvan (2007).

[34] Srirai (2008, 15-16); also see Ball and Mathieson (2007).

[35] "Expelling farmers for Convenience," *Bangkok Post*, 11 January 2005, pp.2. For more details on this see, McCargo and Pathmanand (2005); Liow and Pathan (2010).

[36] "Food fights between BRN-C and Farmers in Songkhla," *The Nation* 19 November 2004, pp.A-2. Additionally, see "Expelling farmers for Convenience," *Bangkok Post*, 11 January 2005; Montesano and Jory (2008).

would not have to bear the "costs of feeding and maintaining the rural workforce at a time of severe water crisis"[37] in Songkhla (Chongkittavorn, 2004; Aphornsuvan, 2007; Helbardt, 2011).

Interestingly, similar to the Naxalites in Bastar and Dantewada, the BRN-C rebel organization employed targeted killing of farmers working in Rattaphum, Na Mom and Bang Klam (in Songkhla) as a tactic to evict these farmers from their rice fields (e.g., Rattanachaya, 2004; Ball and Mathieson, 2007). To see this in some detail, it is important to first note that there was a significant increase in violence committed against (specifically killing of) civilians by the BRN-C in the rice-producing districts and villages of Songkhla during the severe drought of 2004 (Rattanachaya, 2004; Gunaratna, Acharya and Chua, 2005). For instance, a report released by Government of Thailand's Ministry of Interior in 2005 points out that

> "...according to estimates, there was an astounding 90% increase in the share of villagers killed in Songkhla in the drought year of 2004...Beheading, hangings and beatings of farmers in Songkhla became common; women, children, farmers and their families have been murdered and 'disappearances' become a frequent occurrence."[38]

Reports by the media and Human Rights Watch also documented that during the 2004 drought in Songkhla "tactics used by the BRN-C had become savage"[39] in that the BRN-C "systematically killed over a thousand farmers in Rattaphum alone, forcefully displaced villagers from their paddy fields, burnt houses"[40] and captured grain stockpiles (Chongkittavorn, 2004; Rattanachaya, 2004). Furthermore, the BRN-C's tactic of killing rural civilians continued throughout 2004 and well into 2005 (Davis, 2005; Gunaratna, Acharya and Chua, 2005).It is important to note here that the BRN-C perpetrated violence and killing of rural civilians during the 2004 drought in Songkhla was not random. Rather, as suggested in recent research, "there

[37]"BRN-C and the insurgency in Thai south," *Straits Times*, 25 September 2004, p.7. "Who Controls the insurgency in Songkhla," *The Nation*, 11 August 2004. Also see Rattanachaya (2004); Srirai (2008).

[38]*Ministry of Interior*, July 2005, "Civilians Attacked and Villages Raided by BRN-C in Songkhla in 2004." Bangkok: Government of Thailand, pp. 27. For more analysis of this issue see "The BRN-C and the Southern Malaise," *Bangkok Post*, September 4 2005, pp.2; Srirai (2008).

[39]Chongkittavorn (2004, 9-10); also see Gunaratna, Acharya and Chua (2005); Srirai (2008).

[40]"Death Toll Could be Far Higher," *The Nation*, October 30 2004, pp.2; Davis (2005); Srirai (2008); Helbardt (2011).

is sufficient evidence to believe that the killing of civilians by the BRN-C in 2004 was driven by some strategic objectives"[41] which is in contrast to media reports that focused on the morally abhorrent character of the BRN-C's violence. What then are these strategic objectives?

As predicted by our theory, the first objective behind the BRN-C led killing of civilians in the villages of Songkhla in 2004 was to send a "clear signal to farmers and residents in the villages that the BRN-C meant business"[42] and that it was "willing to impose serious physical harm on those individuals who opposed the insurgents by remaining on their property"[43] which belonged to the BRN-C. A report by the Thailand's Ministry of Interior in 2005 also suggests that the leaders of BRN-C felt that committing atrocities against farmers working in the rice fields of Songkhla would send an "unambiguous message to the farmers that their presence in the rice fields would not be tolerated...murdering the villagers would produce a deep-rooted fear among farmers that their lives would be in danger if they remained on their farmlands"[44] and that they would be spared only if they fled from their farms plus abandoned their property (Rattanachaya, 2004; Davis, 2005; Montesano and Jory, 2008).

The Ministry of Interior's insight is confirmed by other researchers as well who posit that "violence was frequently directed by the BRN-C against farmers in Songkhla to drive them *away* from their farms"[45] (italics added) and the region in general (Davis, 2005; Montesano and Jory, 2008). Generating fear among the farmers in the villages of Songkhla (by resorting to indiscriminate killings) so as to drive them away from their farms was considered necessary by the BRN-C as it would help them to capture and settle in these farms without concerns about serious opposition from rural peasants (Janchitfah, 2004; Rattanachaya, 2004; Srirai, 2008). Indeed, expelling the farmers from their rice fields by threatening them with overt physical danger (i.e., killings, beheadings, burning houses) was seen by "BRN-C commanders as a tactic to discourage the farmers from forming associations to defend their farmland, crops stored on

[41] *Ministry of Defense*, March 2005, "Domestic Security Problems in Thailand" (White Paper), Bangkok: Supreme Command Headquarters, pp. 16. Further, see "Southern carnage: kingdom shaken," *The Nation*, 29 Apr. 2004, pp.1; Gunaratna, Acharya and Chua (2005).

[42] "Who Controls the insurgency in Songkhla," *The Nation*, 11 August 2004, p.2. Also see Rattanachaya (2004).

[43] "Food fights between BRN-C and Farmers in Songkhla," *The Nation* 19 November 2004, pp.A-2. Additionally, see Janchitfah (2004); Srirai (2008); Liow and Pathan (2010).

[44] *Ministry of Interior*, July 2005, fn.37, pp. 28. Additionally, see Chongkittavorn (2004); Montesano and Jory (2008); Srirai (2008).

[45] Janchitfah (2004, 53); *Ministry of Defense*, March 2005, fn.17, pp. 16-17; Aphornsuvan (2007).

the land"[46] and their property (Rattanachaya, 2004; Davis, 2005).

The BRN-C's second objective for killing farmers in the village-areas of Rattaphum, Na Mom and Bang Klam in Songkhla was driven by the need to curtail the number of individuals who could consume the limited amount of rice and other foodstocks stored by the farmers on their croplands during the 2004 drought (Chongkittavorn, 2004; Rattanachaya, 2004; Davis, 2005). This has been suggested not only by researchers and the print media[47] but also in an interview given by a captured BRN-C leader "Hama" who commented that,

> "...killing of rural civilians in Rattaphum, Na Mom, Bang Klam was an integral part of the BRN-C's strategy to get them to leave their farms and to prevent them eating rice saved in *B̂ān k̄ĥāws* as the BRN-C needed this rice...once we have won, everybody will see that these [i.e., violent actions] were cruel, but civilians were necessary victims. It's something that is done in the BRN-C's interest."[48]

Interestingly, the BRN-C's tactic of using violence against civilians (i.e., farmers) in Songkhla in 2004 was quite effective as one observer estimated that as many as 30-40 percent of residents in the Songkhla region reportedly left their homes and fled from the region as a result of the BRN-C's targeted violence.

Somalia and Peru Examples

We also briefly discuss anecdotal evidence from two more examples, Somalia and Peru, to corroborate our key theoretical claims that explore the link between severe drought in rural croplands of developing countries and killing of civilians by rebels operating in these croplands. First, note that in Somalia, "farmers in the villages of Lower Jubba started frantically storing crops in houses and granaries on their land to maintain food reserves to feed their families during the prolonged drought"[49] of 2011 (Ferris, 2011; Bryden, 2014; Lindley, 2014). As

[46] Chongkittavorn (2004, 12). Also, see *Ministry of Defense*, March 2005, fn.42; Janchitfah (2004); Srirai (2008).

[47] "BRN-C and the insurgency in Thai south," *Straits Times*, 25 September 2004; "The BRN-C and the Southern Malaise," *Bangkok Post*, September 4 2005; Srirai (2008); Liow and Pathan (2010).

[48] *Ministry of Defense*, March 2005, fn.42, pp. 16. Also see Srirai (2008); Ball and Mathieson (2007).

[49] "Al-Shabaab Seeking Survival In Drought," *Wardheer News*, 14 October 2011, pp.3; also see "Drought and Conflict in Jubba Continues Unabated," *The East African*, 6 November 2011; Lindley (2014).

mentioned in the main paper's text, this act of storing of crops by the peasants in Lower Jubba in 2011 encouraged the Al-Shabaab rebels to seek to "raid and capture" the farmers' agricultural lands to "forcibly usurp, eat, and distribute food among their group"[50] to sustain themselves in the drought period (Zimmerman, 2011; Hansen, 2013; Lindley, 2014). Such stored food supplies was necessary for survival of Al-Shabaab group members and their "capacity to remain as a cohesive"[51] unit (Ferris, 2011; Galindo, 2015). A similar dynamic also occurred in Peru during the severe drought of 1982 in the rural part of country's southern provinces of Tacuna and Arequipa that contain farmlands in which rice, soyabean and (some) pulses are the predominant cultivated crops (Masterson, 1991; Poole and Rénique, 1992; Simpson, 1993). Specifically, during the "onset of the 1981 drought, farmers in Arequipa stored a variety of crops to serve as a food-bank"[52] in order to sustain themselves throughout the drought (Masterson, 1991; Poole and Rénique, 1992). This act of storing crops and other food items was noted by the anti-government Tupac Amaru rebels who then "calculated that capturing the farms of would help them to obtain the necessary stored food from these farms"[53] for their own survival during the drought period (Masterson, 1991; Beverly, 2008; Galindo, 2010).

It is important to note here that during the 2011 drought, the farmers in Lower Jubba recognized — as emphasized by scholars— that "Al-Shabaab would raid their lands and capture their stored crops, food and other property"[54] to sustain and finance themselves (Ferris, 2011; Galindo, 2015). This prompted the farmers to "initiate meetings in which they openly called for armed, trained defensive militias to protect their land, crops"[55] and their livelihood (Galindo, 2015). These "meetings" to set up self-defense groups did not go unnoticed by Al-Shabaab. They recognized in the drought of 2011 that once the farmers in Lower Jubba fully organize

[50] "Farms Raided by Al Shabaab to obtain Sorghum," *Somaliland Times*, 22 January 2012; Zimmerman (2011); Hansen (2013).

[51] "Food and Politics in Al-Shabaab in Afamdow and Kismayo," *Wardheer News*, 10 December 2011; also, see "Drought and Conflict in Jubba Continues Unabated," *The East African*, 6 November 2011; Zimmerman (2011).

[52] "Water scarcity and farmers' survival strategies in Arequipa," *Peruvian Times*, 15 March 1983, p.7; also see Masterson (1991); Beverly (2008).

[53] "Túpac Amaru elige para capturar las granjas para alimentar a los miembros del grupo," *La Republica*, 25 January 1983, p.2 (translated to English with title "Tupac Amaru chooses to capture farms to feed group members"), pp.2. Further see Beverly (2008).

[54] "Al-Shabaab Seeking Survival In Drought," *Wardheer News*, 14 October 2011, fin. 49, pp.3; additionally, see "Farms Raided by Al Shabaab to obtain Sorghum," *Somaliland Times*, 22 January 2012; Hansen (2013).

[55] "Farms Raided by Al Shabaab to obtain Sorghum," *Somaliland Times*, 22 January 2012; pp.2. Furthermore, see Galindo (2015).

their defense groups, their (Al-Shaabab's) "capacity to capture the farmers' agricultural land and crops would be costly and may be even impossible to get"[56] thus setting of "alarm bells" among the leaders of Al-Shabaab (Zimmerman, 2011; Hansen, 2013).

Key group members in Al-Shabaab in 2011 also felt that the farmers in Lower Jabua would "neither be useful assets nor serve as productive workers as they were seriously emaciated"[57] by the "terrible" drought conditions at the time (Gartenstein-Ross and Vassefi, 2011; Galindo, 2015). Al-Shaabab's concern that the farmers in Lower Jubba could "credibly block their land-grabbing attempt if they formed defense organizations"[58] and their perception about the farmers' physical limitations as useful workers went a long way toward convincing Al-Shabaab in 2011 that they need to "expel the local farmers from their agricultural land when severe water shortages resulted from the drought." This particular phenomenon of rebels seeking to evict local peasants from their farmland under conditions of onerous water scarcity also occurred in Peru during the severe drought of 1982 in the country's southern provinces (Poole and Rénique, 1992; Simpson, 1993; Ellenbogen, 1999).[59] Similar to Lower Jubba (Somalia) in 2011, rural peasants in the farms of Tacuna and Arequipa "expected that Túpac Amaru would attempt to forcefully grab their land, crops and property"[60] to feed group members during the 1982 drought (Masterson, 1991; Ellenbogen, 1999; Beverly, 2008). Thus during the 1982-83 drought, peasants in both Tacuna and Arequipa (Peru) created their own civil defense forces to "prevent the continuous robbery of cattle, of crops, house-breaking, assaults...committed...by individuals who wander well armed at night" (Ellenbogen, 1999; Gitlitz and Rojas, 1983, 163). The Túpac Amaru rebels who were interested to appropriate the farmers' croplands in Arequipa during the 1982 drought viewed the farmers' potential defense militia as a "serious to challenge to their objective of capturing the agricultural property"[61] in which the farmers 'had stored suf-

[56] "Local Farmers and Al Shabab: An Uneasy Relationship," *The East African*, 4 December 2011, pp.3; Lindley (2014); Galindo (2015).

[57] "Local Farmers and Al Shabab...," Ibid., fn.56, pp.3; Galindo (2015).

[58] "Farmers Discouraged from Organizing Defenses," The Daily Nation, pp.2. Also see McKenzie (2011); Hansen (2013).

[59] "Local Farmers and Al Shabab...," fn.56, pp.3; Hansen (2013); Lindley (2014).

[60] "Water scarcity and farmers' survival strategies in Arequipa," *Peruvian Times*, fn.52, pp.7; also see Masterson (1991); Beverly (2008).

[61] "Túpac Amaru elige para capturar las granjas para alimentar...," *La Republica*, 25 January 1983, fn. 53, pp.2; Masterson (1991); Walker (1999).

ficient quantities of crops and fruits that Túpac Amaru members could use for their survival"[62] in the drought period (Poole and Rénique, 1992; Simpson, 1993; Beverly, 2008). Concerns about the growth and military strength of the farmers' planned civil defense associations — and "openly expressed beliefs about the farmers' inability to be financially useful"[63] because of water shortages — were critical factors that influenced Túpac Amaru to drive the peasants away from the farmland in 1982 and later in 1983 as well (Poole and Rénique, 1992; Walker, 1999; Beverly, 2008).

Returning to the case of the Al-Shabaab rebels who wanted to evict the farmers in Lower Jabua away from their farmlands in 2011, we find that there was a dramatic increase in the number of such civilian farmers killed by Al-Shabaab during the 2011 drought (McKenzie, 2011; Human-Rights-Watch, 2013; Lindley, 2014). For example, one study points out that during the severe 2011 drought, Al-Shabaab "went on a murderous rampage killing several hundred local civilians and farmers in Jubba"[64] with the "advertised intent" of driving the farmers away from their land and (then) taking over the farmers' agricultural property (Hansen, 2013; Galindo, 2015). International NGOs like Human rights Watch also pointed out in 2011 that in addition to civilian-targeted attacks by Al-Shabaab in Mogadishu, several "cells" of Al-Shabaab also repeated killed "hundreds of civilians in the rural hinterlands of Jubba"[65] during the 2011 drought. And a report released by a CNN journalist (David McKenzie) who interviewed survivors of rural civilian family members who were killed by Al Shabaab rebels during the 2011 drought pointed out that

> "And person after person told CNN that their husbands have been killed by Al Shabaab. Shamso Hassan, who escaped just days ago, said many of the men in her village were killed. Some of the survivors, such as her elderly father, Abdul Yousuf, managed to escape. "There was heavy fighting going on in our area. We were hiding and some men came into our house. They took my husband out and they

[62] "Túpac Amaru elige para capturar las granjas para alimentar...," *La Republica*, 25 January 1983, fn. 53, pp.2; Simpson (1993).

[63] "Recent tactics of Túpac Amaru," *Peru Reports*, 12 February 1983; pp.1; also see Poole and Rénique (1992); Simpson (1993).

[64] "Drought and Conflict in Jubba Continues Unabated," The East African, fn.49; McKenzie (2011); Zimmerman (2011).

[65] "Al-Shabaab Seeking Survival In Drought," *Wardheer News*, 14 October 2011, fin. 49, pp.3; Hansen (2013).

slaughtered him like a goat," Hassan said, passing her finger across her throat."[66]

In fact, killing of rural civilians and farmers in Lower Jhabua during the 2011 drought by Al-Shabaab escalated to such an extent that the Africa director at Human Rights Watch at the time emphatically stated that "Al-Shabaab's heinous attack" on civilians "shows utter disregard for civilian life...Al-Shabaab should immediately stop targeting civilians."[67]

Why did the Al-Shabaab resort to such mass killings of civilian farmers in Lower Jubba during the 2011 drought? As predicted by our theory, numerous researchers and newspaper articles have emphasized that one important reason that explains why Al-Shabaab opted to kill rural civilian peasants was "to create terror among local civilians in the drought affected crop cultivating areas of Lower Jubba...the idea was to generate as much terror as possible to send strong signals to the civilians that Al-Shabaab could kill and harm them at anytime."[68] Furthermore, the ostensible objective behind sending these signals (via indiscriminate killing of civilians) was to (as also suggested in our theoretical story) "make sure that the farmers in Jhabua would be fearful of Al-Shabaab's tactics...Indeed, Al-Shabaab's fully understood that if the civilian farmers in Lower Jhabua was fearful that Al-Shabaab can kill, maim and threaten to physically destroy them,"[69] then it would "compel the farmers to run away from their lands"[70] and abandon their property (Human-Rights-Watch, 2013; McKenzie, 2011; Lindley, 2014). This in turn would facilitate land-grabbing and control of farmland in Lower Jubba by Al Shaabab (Zimmerman, 2011; Galindo, 2015).

Similar to Somalia in 2011, there was also a "spike" in civilian-targeted killings by Túpac Amaru in the agricultural lands of Tacuna and Arequipa (Peru) in the context of the 1982 drought in the region. For example, it was reported that over "three hundred local peasants and their families were killed by men from Túpac Amaru in Tacuna when the rains failed

[66]See David McKenzie. "Somalis fear tyranny of al-Shabaab as they flee drought-stricken areas," CNN News, September 6, 2011. http://www.cnn.com/2011/WORLD/africa/09/05/somalia.al.shabaab.drought/.

[67]Daniel Bekele cited in "Somalia: Al-Shabaab Attack Indefensible Mogadishu Bombing Shows Price Being Paid by Civilians" Human Rights Watch, October 5 2011; https://www.hrw.org/news/2011/10/05/somalia-al-shabaab-attack-indefensible.

[68]"Al-Shabaab Seeking Survival In Drought," *Wardheer News*, 14 October 2011, fin. 49, pp.3; Checci and Robinson (2013); Lindley (2014).

[69]"Farms Raided by Al Shabaab to obtain Sorghum," *Somaliland Times*, 22 January 2012, pp.1; Hansen (2013); Checci and Robinson (2013); Galindo (2015).

[70]"Farms Raided by Al Shabaab to obtain Sorghum," *Somaliland Times*, 22 January 2012, pp.1; McKenzie (2011); Zimmerman (2011); Galindo (2015).

in 1982"[71] and in general Túpac Amaru carried out a concerted campaign of violence and atrocities against these rural civilians for much of 1982 and the first half of 1983 (Poole and Rénique, 1992; Simpson, 1993; Beverly, 2008). More systematic research by scholars further show that in 1982 there was a "sharp increase and upward trend in the number of peasants killed in particularly (but not only) Arequipa by Túpac Amaru during the weeks and days in which the region was plagued by serious water shortages"[72] because of the drought (Masterson, 1991; Poole and Rénique, 1992). An "infamous" report in the also voiced concern that the dramatic increase of rural civilians killed in the Arequipa region by Túpac Amaru may lead to a "complete breakdown in law and order"[73] and thus to total anarchy (Poole and Rénique, 1992; Walker, 1999). Note that the Túpac Amaru rebels underlying tactics for indiscriminately killing rural civilians in Peru in 1982 are largely similar to those of Al-Shabaab. For instance, scholars have hypothesized (based on extensive field research) that the leaders from Túpac Amaru were "cognizant of the reason that targeting and killing farmers, stealing their crops and cattle would visibly indicate to farmers in Areuipa that the farmers need to leave their land"[74] during the drought period and that they (the farmers) would not be safe if they chose to remain on their agricultural land (Poole and Rénique, 1992; Walker, 1999; Beverly, 2008). The Túpac Amaru rebels also viewed the "random killing of local peasants as a cost-effective strategy that would produce deep-rooted fear"[75] among villagers residing in Arequipa during the 1981 drought. As such, this deep-rooted fear would — from the perspective of the Túpac Amaru rebels — help them to make it clear to the local farmers that they "meant business" in terms of taking over and fully controlling the farmers' farmlands as well as stored crops for their (the rebels') sustenance (Poole and Rénique, 1992; Simpson, 1993; Walker, 1999). And, more importantly, in the words of the print media, the Túpac Amaru group believed and "fully understood" that the fear generated by their indiscriminate killing of local farmers would force these civilian peasants to flee from their farmland thus allowing members from Túpac Amaru to more easily

[71] Masterson (1991, 117); also see Poole and Rénique (1992); Simpson (1993); Beverly (2008).

[72] Masterston, *Ibid.*, pp. 119; Ellenbogen (1999); Poole and Rénique (1992).

[73] "Recent tactics of Túpac Amaru," *Peru Reports*, 12 February 1983; pp.1; Masterson (1991); Beverly (2008).

[74] "Recent tactics of Túpac Amaru," *Peru Reports*,*Ibid.*, pp.1; Simpson (1993); Ellenbogen (1999).

[75] " Túpac Amaru elige para capturar las granjas para alimentar...," *La Republica*, fn.53. pp.2; Simpson (1993); Ellenbogen (1999); Walker (1999).

"capture, control and consume the food stored in the farmlands in Arequipa"[76] in the drought period of 1982 (Poole and Rénique, 1992; Walker, 1999).

III. India & Thailand Analyses

As mentioned in the main paper, statistically evaluating our claims with respect to droughts and the expropriation of civilian food stockpiles by rebels is extremely difficult, given that there is no publicly available cross-national data (to our knowledge) on the stockpiling of food from rural civilians and cropland expropriation by rebels. To briefly evaluate our claim about droughts and land expropriation by rebels, we independently coded a selection of regional data on rainfall and agricultural land expropriation by rebels to provide illustrative quantitative evidence from India and Thailand. These data are geocoded at the district-level in India and the province-level from Thailand. Recall that in India anecdotal evidence shows that rebel groups, particularly the "Maoist" Naxalite rebels, operate in rural cropland districts (e.g. Bastar, Gumla) across the following seven "red" states, illustrated (and divided by district) in Figure A.1a: Andhra Pradesh, Bihar, Chattisgargh, Jharkand, Madhya Pradesh, Orissa and West Bengal.[77] In these states, the expropriation of agricultural property by Naxalite rebels was frequent, and over 90% of civilians massacred by the Naxalites have occurred within these seven states (Sundar, 2007; Gregory, 2013).

We thus assess the link between severe drought and cropland expropriation by Naxalite rebels in crop-producing districts within the seven listed Indian states between 2002 and 2009 (the years for which land expropriation data was available). Our district-year sample consists of 58 districts[78] across the seven aforementioned states where, according to India's Ministry of Agriculture and Farmer's Welfare reports, three main crops (rice, bajra, kharif) — a critical component of farm output and rural consumption — are produced (NREGA, 2010).

The dependent variable is a dichotomous measure land expropriation$_t$ coded "1" when Naxalite rebels specifically expropriate the agricultural property of rural civilians in each of the 58

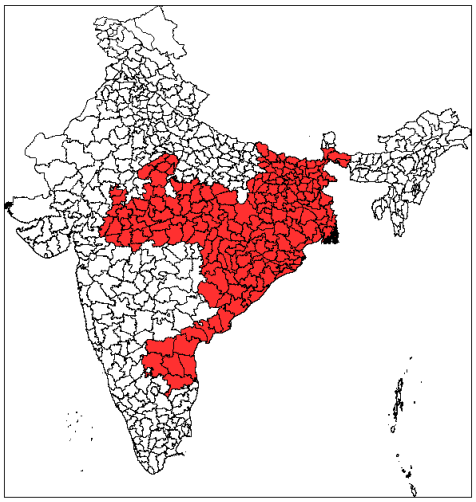
[76]" Túpac Amaru elige para capturar las granjas para alimentar...," *La Republica*, *Ibid.,* pp.2; Simpson (1993).

[77]See e.g., Eynde (2011); Gawande, Kapur and Satyanath (Forthoming); Gregory (2013).

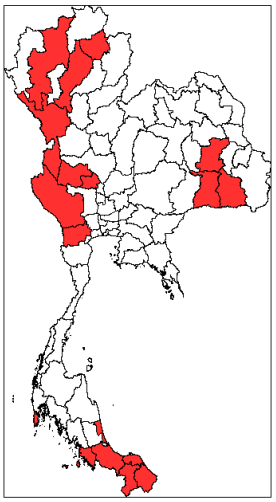
[78]*Examples* of these districts include Banka, Bankura, Bastar, Dantewada, Dhar, Dumka, East Godavari, Gajapati, Latihar, Munger, Kurnool, Saran, Saran, Suraj, Sukma, Uttar Dinajpur etc. The names of the remaining districts in the India-country sample is not listed here to save space but is available on request.

Figure A.1: The Regions Analyzed in India and Thailand

(a) India Districts



(b) Thailand Provinces



districts (2002-2009) and coded "0" otherwise. Data for coding this variable were obtained from the Government of India's Ministry of Rural Development NREGA annual reports (2002-09), primary sources such as National English newspapers (e.g. The Times of India),[79] local editions of national English dailies,[80] and local language vernacular newspapers from the seven states.[81] The independent variable is a binary *severe drought* measure, operationalized in two steps. First, we gathered rainfall data using the high resolution $1^{\circ} \times 1^{\circ}$ latitude/longitude daily rainfall dataset for the Indian region, recorded by the India Meteorological Department's (IMD) National Data Center, which measures district-level rainfall. We aggregate this daily rainfall data for each district into annual measures in centimeters. Second, following the IMD's definition of severe drought, we created the binary drought_t measure: a given district was coded "1" if the annual rainfall amount falls 2 standard deviations below the district's mean rainfall level for the 2002-09 period; coded "0" otherwise. We also employ robustness analyses to show our findings hold if annual rainfall in the district falls 1.5, 2.5 or 3 standard deviations below the

[79]These newspapers include *The Times of India, The Hindu, Indian Express, Telegraph.*

[80]These local English Dailies: *The Times of India—Patna edition*, *The Hindu, Indian Express, Navbharat Times, Deccan Chronicle*, and the *Daily Chattisgarh*

[81]These vernacular newspapers from each of the 7 "red" states include (1) Andhra Pradesh: Eenadu, Praja Sakit, Andhra Bhoomi; (2) Bihar: Bihar Times, Dainik Jagran; (3)Chattisgarh: Patrika Hindi News, Naidunia; (4).Jharkand: Dainik Bhaskar, Khabar Mantra; (5) Madhya Pradesh: Navbharat Times, Naidunia; (6) Orissa: Dharitri, Samaja; (7) West Bengal: Banglatelegraph, Anand Bazar Patrika

district's mean level of rainfall.

The effect of drought$_t$ on *land expropriation* in the India district-year sample is positive and significant at the 1% level in the baseline (random effects) probit specification, where only one control (forest$_t$) is included (see India results, Table A.1). Drought$_t$ remains positive and highly significant as we move to the fully specified (random effects) probit model in Table A.1. This model include the following controls, which scholars suggest are positively associated with Naxalite land expropriation:[82] mineral$_t$, forest$_t$, and expropriation$_{t-1}$.[83] Our fully-specified probit model also reveals (using parametric bootstraps, where control variables are held at their median, for ordinal variables, and modal, for binary variables, values) that a 0-to-1 increase in drought$_t$ increases the probability of land expropriation by 11% within these seven states. This substantive effect is significant at the 95% confidence level, indicating that severe drought increases the degree of agricultural property expropriation by the Naxalites.

Next, we analyze the Thailand example. Studies show that over 90% of rural civilians killed by rebel groups (e.g., the Pattani United Liberation Organization) resided in 18 provinces, as illustrated in Figure A.1b and discussed in the relevant existing studies (Human-Rights-Watch, 2007; Davis, 2010; Helbardt, 2011).[84] These 18 (largely) agricultural provinces produce 80% of Thailand's five key crops: rice, sugarcane, rubber, corn, and maize.[85] We thus geocode data on rainfall and cropland expropriation by rebels and other controls for each of these 18 Thai provinces from 2004 to 2010 (the years for which data were available).

The dependent variable for the Thailand sample is again the binary land expropriation$_t$ measure coded as "1" for provinces where rebels expropriate agricultural property between 2004 and 2010; "0" otherwise. Land expropriation$_t$ is operationalized using the following sources: Helbardt (2011), English daily newspapers (e.g. Bangkok Post), and the Thai government's Na-

[82] See Sundar (2007); Gregory (2013).

[83] These variables are operationalized from the following primary sources: (i) Government of India. Ministry of Environment and Forest, "District-Wise Forest Cover", GOI: New Delhi; (ii) Government of India. Ministry of Home Affairs, "District Census Handbook", GOI, IMHA: New Delhi; (iii) Government of India, Registrar General and Census Commissioner, 2001. Census data, GOI: New Delhi (iv) Government of India, Ministry of Mines, 2010, "Annual Report 2009-10", Annexure 3, GOI: New Delhi; (v) Government of India, Ministry of Mines, 2009, "Annual Report 2008-2009", Annexure 3.1, GOI: New Delhi.

[84] These 18 provinces are: Buriram, Chai Nat, Chiang Mai, Kanchanaburi, Lampang, Narathiwat, Pattani, Phayao, Phuket, Ratchaburi, Roi Et, Satun, Si Sa Ket, Songkhla, Surin, Tak, Uthai Thani, and Yala.

[85] See National-Statistics-Office (1985).

tional Statistical Office's *Socio-Economic Survey Datatapes* 2010.[86] The binary independent variable *drought* was again operationalized in two steps. First, we gathered monthly rainfall data for the years 2004 to 2010 for these 18 provinces using the Government of Thailand's Meteorological Department "Monthly Rainfall Reports," which measures province-level rainfall data collected by 61 meteorological stations. We then aggregate this monthly rainfall data for each province into annual measures in centimeters. The binary variable drought_t is again coded as "1" when the annual rainfall for a given province falls 2 standard deviations below the province's mean for the 2004-10 period; "0" otherwise. Again, we show that these results hold when the province's annual rainfall falls 1.5, 2.5 or 3 standard deviations below the within-province mean rainfall level.

The impact of drought_t on land expropriation_t in the Thailand province-year sample is positive and highly significant in all (random effects) probit specifications (see Thailand results, Table A.1), as we move from the baseline specification that only includes the forest_t variable to a fully-specified probit model that includes $\text{expropriation}_{t-1}$ and four controls — forest_t, Muslim fraction_t, tobacco_t, and oil palm cultivation_t.[87] These findings confirm the argument that droughts affect the expropriation of cropland by rebels in Thailand.[88] Using parametric boostraps while holding all other variables to their medians or modes, our full random effects probit model suggests that a 0-to-1 increase in drought_t yields a 27% increase in the probability of land expropriation_t in Thailand; this effect is statistically significant at the 95% confidence level. Thus the brief analysis of the Thailand and India cases, as well as anecdotal evidence, suggests that our argument that rebels expropriate agricultural land from civilians during severe droughts is quite plausible. As we show below, additional comparative statics from our model

[86] Also see the following additional sources: (i) Government of Thailand. (Various years) Province Security Annual Reports. Office of the National Security Council (in Prime Minister's office). Bangkok: Government of Thailand and (ii) National Statistics Office. 2013. Thailand's Agricultural Census. Bangkok: Government of Thailand

[87] These controls are drawn from: (i) Govt of Thailand. Ministry of Natural Resources and Environment, "Rapid Forest Cover Assessment" (2004-10); (ii) Govt of Thailand. Royal Forest Department, "Forestry Statistics of Thailand" (2004-10); (iii) National Statistical Office. 2012. Advance Results: Population and Housing Census. National Statistical Office, Govt of Thailand; (iv) National Statistical Office. Data: Population and Housing Census 2000. National Statistical Office, Govt of Thailand; (v) Agricultural Statistics of Thailand, Office of Agricultural Economics, Govt of Thailand (2000-2010); (vi) Agricultural Statistics of Thailand, Office of Agricultural Economics Govt of Thailand (2004-2010); (vii) Ministry of Agriculture and Cooperatives. 2011. Agricultural Statistics of Thailand Crop Year (2000-10). Centre for Agricultural Statistics, Bangkok

[88] See e.g., Davis (2010); Helbardt (2011).

(summarized in Proposition 2 within the main paper) also suggest that during droughts, rebels will commit atrocities against civilians to facilitate expropriation and increase the probability of successfully grabbing cropland and food supplies.

Before turning to this analysis, it is important to note that land expropriation$_t$ dependent variable for both our Thailand and India samples—as depicted within Figure A.2 and Table A.3—is heavily weighted towards "no expropriation" for the India sample, but it is more evenly distributed for the Thailand sample (owing in part to the moderately larger units of temporal aggregation used in the latter). As such, for both individual country-samples, we report a second robustness table, that re-assesses our primary India and Thailand land expropriation$_t$ models while using penalized maximum likelihood-estimated logistic regressions within Table A.2. We find in this Table that our results for drought$_t$ on *land expropriation* are generally robust to this alternate estimation strategy. Thus the brief expropriation analyses of the Thailand and India cases, as well as the anecdotal evidence discussed in the main paper, suggest that our argument that rebels expropriate agricultural land from civilians during severe droughts is quite plausible. Yet it is important to note here that, as posited within our main paper's theory section, the rebels also recognize *ex ante* that they will face a fundamental trade-off *ex post* upon expropriating the cropland. To reiterate, this trade-off is as follows—on the one hand, the rebels can capture or co-opt the rural civilian labor in the expropriated cropland and use them for agricultural production. Doing so will make it necessary for the rebels to "maintain" the captured labor and share some of the stockpiled food with these rural workers as they need at least subsistence consumption of food for survival. On the other hand, the rebels can potentially *expel* the rural civilian workers from the cropland and then use the entire stockpiled food for their own consumption instead of sharing it with the workers. Our model suggests that in the specific context of a severe drought, the rebels will address this trade-off by optimally choosing to *not* employ the rural labor for agricultural production in the cropland that they seek to expropriate. Rather our model suggests that the rebels will rationally opt to expel — in other words evict — the rural labor from the cropland and in fact, they will commit atrocities against the civilian workers to evict them from their croplands.

To empirically evaluate our claims in this regard, we again conduct a brief statistical anal-

ysis of district-year data from the same 58 Indian districts (2002-09) and 18 Thai provinces (2004-10) examined above to explore the link between severe droughts and rebel-perpetrated atrocities in these two countries. The dependent variable for the India district-year sample is the civilian deaths$_t$ (count) variable that captures the number of civilians killed by Naxalite rebels each year from 2002 to 2009, for each of the 58 districts in the seven red states. This variable was operationalized from the the Government of India's Ministry of Home Affairs reports, additional secondary sources[89] and primary sources including national English newspapers,[90] local editions of English daily newspapers,[91] and local language vernacular dailies from the seven states.[92] The independent variable is again the binary drought$_t$ measure described in the previous section. As Table A.1 illustrates, drought$_t$ again produces a positive and highly significant effect on civilian deaths$_t$ in both (fixed effects) negative binomial models: the (i) baseline specification that includes civilian atrocities$_{t-1}$; and (ii) the fully specified model which, following recent research on Naxalite violence,[93] includes mineral$_t$, forest cover$_t$, registered caste/tribe as a fraction of the total population (social frac.$_t$),[94] and civilian deaths$_{t-1}$. Using parametric bootstraps while holding all other variables to their medians or modes, our fixed effects negative binomial suggests that a 0-to-1 increase in severe droughts leads to a 35% increase in the average district-level rate of civilians killed by Naxalites. This impact is significant at the 95% confidence level, again suggesting a strong positive association between severe droughts and rebel-perpetrated atrocities in India.

The dependent variable for the analysis of rebel-perpetrated atrocities in the Thailand province-year sample is again the count variable civilian deaths$_t$, operationalized as the number of civilians killed per year by anti-government groups for the years 2004-2010 in each of the 18

[89]These additional secondary sources include: (i) "Statistics of Naxal Violence" (Various years) Naxal Management Division, Ministry of Home Affairs, Govt of India: New Delhi and (ii) Rajat Kujur. 2009. "Naxal Movement in 2008: An Assessment", IPCS Issue Brief, New Delhi: India

[90]See e.g. *The Times of India, The Hindu, Indian Express, Telegraph.*

[91]These include *The Times of India—Patna edition*, *The Hindu, Indian Express, Navbharat Times, Deccan Chronicle*, and the *Daily Chattisgarh*

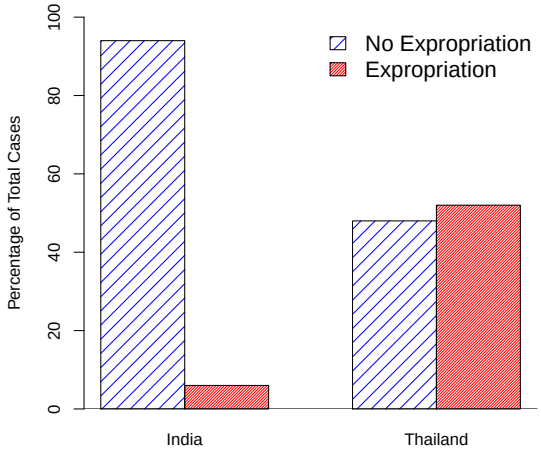
[92]These vernacular newspapers from each of the 7 "red" states include (1) Andhra Pradesh: Eenadu, Praja Sakit, Andhra Bhoomi; (2) Bihar: Bihar Times, Dainik Jagran; (3)Chattisgarh: Patrika Hindi News, Naidunia; (4).Jharkand: Dainik Bhaskar, Khabar Mantra; (5) Madhya Pradesh: Navbharat Times, Naidunia; (6) Orissa: Dharitri, Samaja; (7) West Bengal: Banglatelegraph, Anand Bazar Patrika

[93]E.g., Eynde (2011); Gawande, Kapur and Satyanath (Forthoming).

[94]The sources from which these control variables have been operationalized have been listed in an earlier footnote.

provinces in our sample.[95] To operationalize severe drought we relied on the same binary *drought* measure for Thailand discussed earlier. The impact of drought$_t$ on civilian deaths$_t$ is positive and significant at the 1% level in the following two (fixed effects) negative binomial specifications (see Table A.1): (i) a baseline model that only includes civilian deaths$_{t-1}$ and tobacco$_t$ (to account for a potential relationship between violence and more profitable/tradable crops); and (ii) a fully-specified model that includes civilian deaths$_{t-1}$, forest$_t$, Muslim fraction$_t$, tobacco$_t$, and oil palm cultivation$_t$.[96] As above, bootstrap simulations done while holding all other variables to their modes or medians show that drought$_t$ produces an 18% increase in the rate of civilian deaths$_t$ for our Thailand sample, which significant at the 95% level. These findings again confirm our expectations regarding the positive association between droughts and rebel-perpetrated atrocities in Thailand.

Figure A.2: Distributions of Expropriation$_t$ (India and Thailand)



[95]This variable is coded from the following sources: (i) Deep South Watch (2012). Conflict in Southern Thailand. Center of Conflict Studies and Cultural Diversity. Prince of Songkla University; (ii) International Crisis Group. Crisis Watch Database–Thailand. Various years; (iii) Human Rights Watch. 2007. "No One is Safe: Insurgent Attacks on Civilians in Thailand's Southern Border Provinces." New York: Human Rights Watch; (iv) Helbardt, S. 2011 and (v) Government of Thailand. "Province and Local Violence Yearly Report." Thailand Government Committee on Social Development and Human Security (Office of the Prime Minister). Bangkok: Thailand.

[96]For studies highlighting these variables, see Human-Rights-Watch (2007); Davis (2010); Helbardt (2011). The sources from which these variables are operationalized were listed in an earlier footnote.

Table A.1: Probit and Negative Binomial (NB) Results (India and Thailand)

	Probit Estimates: Land Expropriation$_t$	**s.e.**	**Probit Estimates: Land Expropriation$_t$**	**s.e.**	**NB Estimates: Civilian Deaths$_t$**	**s.e.**	**NB Estimates: Civilian Deaths$_t$**	**s.e.**
India								
Drought$_t$	5.930*	(1.343)	5.140*	(1.409)	0.253*	(0.111)	0.293*	(0.106)
Expropriation$_{t-1}$	.	.	0.365	(0.818)	.	.	.	.
Civilian deaths$_{t-1}$	.	.	.	.	0.001*	(0.0001)	0.001*	(0.0001)
Minerals$_t$	.	.	0.366	(1.410)	.	0.691*	(0.162)	
Forest$_t$	-8.959	(5.612)	-7.360	(5.712)	.	.	0.004	(0.011)
Social frac.$_t$	.	.	.	.	.	.	2.323*	(0.779)
Constant	-7.913*	(1.494)	-7.326*	(1.764)	1.271*	(0.095)	-0.358	(0.493)
ρ	0.967*	(0.013)	0.957*	(0.017)	.	.	.	.
Observations	319		317		318		318	
Log-psuedoikelihood	-25.375		-25.356		-1440.657		-1429.208	
Thailand								
Drought$_t$	1.528*	(0.688)	1.019*	(0.508)	0.141*	(0.058)	0.163*	(0.063)
Expropriation$_{t-1}$	.	.	1.723*	(0.361)	.	.		
Civilian deaths$_{t-1}$	.	.	.	.	0.002*	(0.004)	0.001*	(0.0003)
Forest$_t$	2.237	(1.669)	13.380	(15.617)	.	.	6.218*	(2.913)
Musl. frac.$_t$	.	.	0.018	(0.010)	.	.	-0.001	(0.004)
Tobacco$_t$	.	.	11.548	(14.811)	-.574*	(0.144)	5.522	(2.918)
Oil palm cult.$_t$	.	.	0.006	(0.005)	.	.	0.0004	(0.0004)
Constant	-1.145	(0.827)	-14.452	(15.421)	4.940*	(0.320)	-0.798	(3.027)
ρ	0.657	(0.145)	$4.86e^{-6}$	(0.004)	.	.	.	.
Observations	106		98		106		100	
Log-psuedoikelihood	-57.562		-35.557		-365.695		-331.810	

Note: * indicates $p < .05$; groups are clustered by district for India, and by province for Thailand.

Table A.2: Penalized Maximum Likelihood Logistic Regression Results (India and Thailand)

	Small Specifications: Land Expropriation$_t$	**s.e.**	**Large Specifications: Land Expropriation$_t$**	**s.e.**
India				
Drought$_t$	1.507*	(0.547)	1.557*	(0.718)
Expropriation$_{t-1}$	.	.	3.972*	(0.695)
Minerals$_t$	.	.	0.093	(0.716)
Forest$_t$	0.003	(0.034)	0.020	(0.035)
Constant	-3.385*	(0.352)	-4.133*	(0.530)
Observations	319		317	
Penalized Log-likelihood	-48.991		-31.272	
Thailand				
Drought$_t$	1.137*	(0.517)	1.450$^+$	(0.818)
Expropriation$_{t-1}$	.	.	2.636*	(0.601)
Forest$_t$	0.096	(1.095)	19.654	(23.513)
Musl. frac.$_t$	.	.	0.027	(0.017)
Tobacco$_t$	.	.	16.977	(22.198)
Oil palm cult.$_t$	.	.	0.011	(0.009)
Constant	-0.256	(0.560)	-21.369	(23.181)
Observations	106		98	
Penalized Log-likelihood	-67.588		-28.245	

Note: * indicates $p < .05$; $+$ indicates $p < .10$.

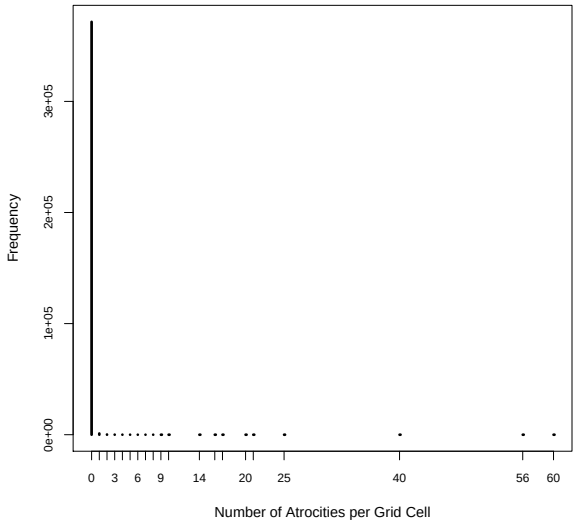
Table A.3: Summary Statistics for Expropriation$_t$ (India and Thailand)

	Median	**Mean**	**Std. Dev.**	**Min**	**Max**	Obs.
Expropriation$_t$ (India)	0	0.06	0.23	0	1	386
Expropriation$_t$ (Thailand)	1	0.52	0.50	0	1	117

IV. Descriptive Statistics & Robustness Models

Figure A.3: Rebel-Perpetrated Atrocity Incidents by Grid-Cell, 1995-2008

(a) Annual Instances of Atrocities



(b) Annual Non-Zero Instances of Atrocities

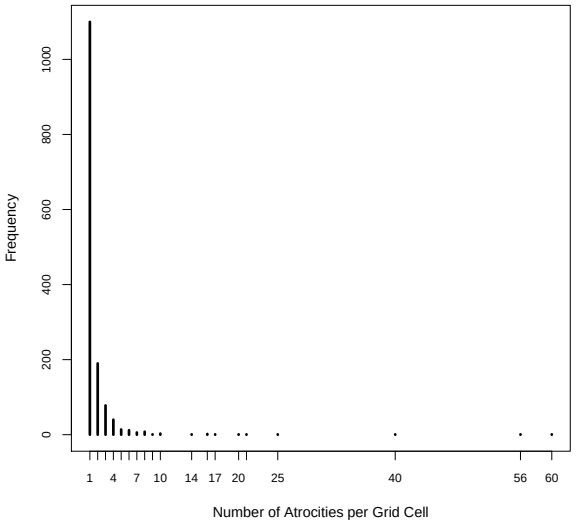


Figure A.4: Rebel-Perpetrated Atrocities Over Time, 1995-2008

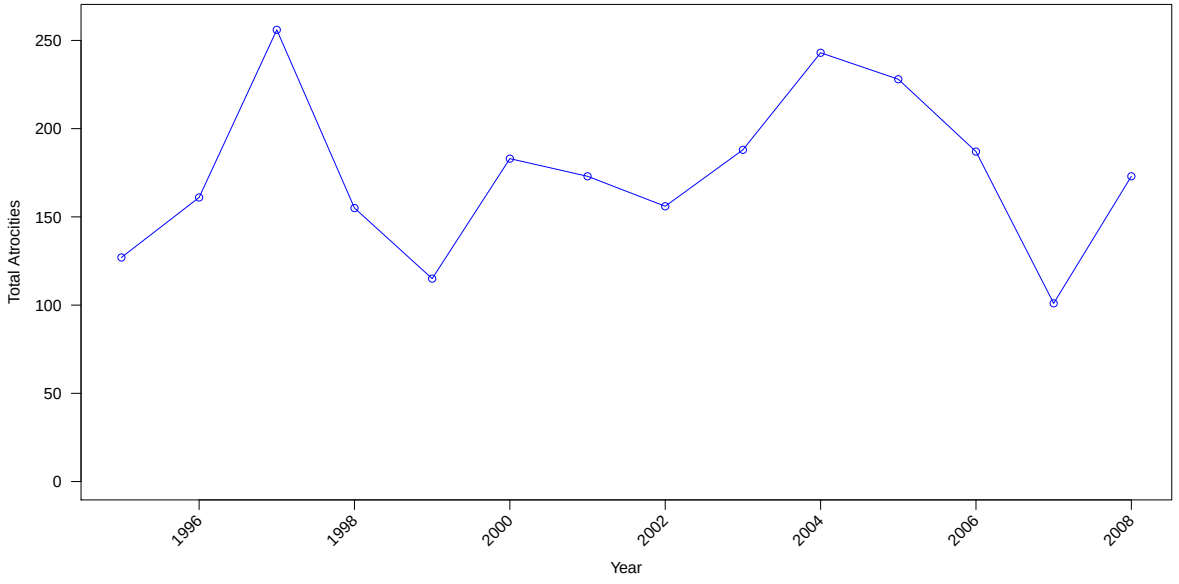


Figure A.5: Rebel-Perpetrated Atrocities Across Countries, 1995-2008

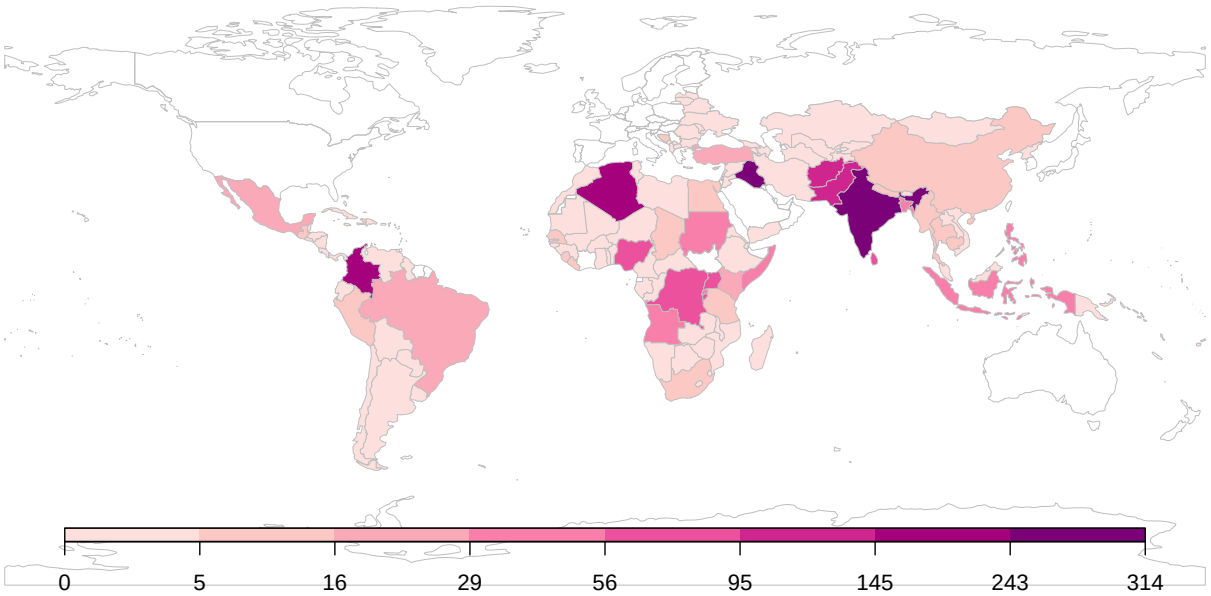


Table A.4: Summary Statistics for All Variables, 1995-2008

	Median	**Mean**	**Std. Dev.**	**Min**	**Max**
Atrocities$_t$	0	0.01	0.21	0	60
Drought$_t$	0	0.09	0.28	0	1
Drought$_t$ Index	0	0.28	0.73	0	2.5
Civil conflict$_{t-1}$	0	0.14	0.35	0	1
Ln travel time$_t$	5.82	5.92	0.98	0	10.31
Ln cell area$_t$	7.93	7.71	0.80	-5.91	8.04
Ln population$_{t-1}$	10.34	10.23	2.17	0	16.63
Ln GCP$_{t-1}$	0.25	0.62	0.79	0	5.85
Polity$_{t-1}$	4	1.82	6.50	-10	10
Ln border distance$_t$	5.15	5.00	1.35	0	7.99
Urban$_t$	0	0.22	1.15	0	51.55
Cropland$_t$	17.34	29.67	31.19	0	99.99
Ethnic Diversity$_{t-1}$	1	1.71	1.42	0	8
Ln GDP pc$_{t-1}$	8.18	8.13	0.94	4.61	9.95
Temperature$_t$	21.97	18.44	9.32	-16.04	35.93
Ln precipitation$_t$	6.59	6.49	0.86	4.22	9.27
Ethnic Fractionalization	0.54	0.51	0.23	0	0.93
Polity$^2_{t-1}$	49	45.58	25.59	0	100
Atrocities$_t$ (GED)	0	0.01	0.33	0	57
Splag Atrocities$_{t-1}$	0	0.003	0.03	0	1
Splag Atrocities$_{t-1}$ (GED)	0	0.002	0.02	0	1
Government Initiated Atrocities$_{t-1}$	0	0.002	0.06	0	12

Table A.5: Primary ZINB Robustness Models (Count Stage)

	Year FE in Inflation-Stage	Spatial Lag in Inflation-Stage	All Additional Controls	Alternative Drought Var.	ZIP Model	GED-Atrocity Sample	Africa Sample	Non-Urban Cells Only
Count Stage								
Drought$_t$	0.336*	0.336*	0.269$^+$	.	0.357*	0.223*	0.420*	0.238*
	(0.130)	(0.130)	(0.144)		(0.154)	(0.096)	(0.163)	(0.116)
Drought$_t$ Index	.	.	.	0.119*	.	.	.	.
				(0.050)				
Civil conflict$_{t-1}$	0.238*	0.238*	0.220*	0.239*	0.247*	0.229*	0.023	0.176
	(0.076)	(0.076)	(0.085)	(0.077)	(0.084)	(0.083)	(0.080)	(0.070)
Ln travel time$_t$	0.035	0.035	0.016	0.032	0.043	-0.086	0.030	-0.029
	(0.099)	(0.099)	(0.092)	(0.099)	(0.107)	(0.089)	(0.086)	(0.090)
Ln cell area$_t$	-0.105	-0.105	-0.574	-0.104	-0.124	-0.055	-0.091	0.055
	(0.111)	(0.111)	(0.364)	(0.111)	(0.123)	(0.165)	(0.133)	(0.092)
Ln population$_{t-1}$	0.077	0.077	0.067	0.076	0.083	0.180*	0.022	0.018
	(0.064)	(0.064)	(0.054)	(0.064)	(0.069)	(0.062)	(0.087)	(0.053)
Ln GCP$_{t-1}$	-0.019	-0.019	-0.004	-0.017	-0.034	-0.192*	-0.075	0.064
	(0.083)	(0.083)	(0.072)	(0.083)	(0.091)	(0.082)	(0.137)	(0.072)
Polity$_{t-1}$	-0.001	-0.001	0.004	-0.0001	-0.001	0.013	-0.014	0.006
	(0.007)	(0.007)	(0.008)	(0.007)	(0.009)	(0.057)	(0.011)	(0.006)
Ln border distance$_t$	0.025	0.025	0.034	0.027	0.027	-0.058	0.038	0.021
	(0.025)	(0.025)	(0.024)	(0.025)	(0.032)	(0.091)	(0.039)	(0.024)
Urban$_t$	0.019	0.019	0.008	0.020	0.022	-0.0001	0.005	0.035
	(0.020)	(0.020)	(0.018)	(0.021)	(0.022)	(0.015)	(0.030)	
Cropland$_t$	-0.001	-0.001	-0.001	-0.001	-0.001	0.0004	0.002	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Ethnic Diversity$_{t-1}$	-0.044	-0.044	-0.035	-0.045	-0.048	-0.129*	-0.094*	-0.029
	(0.035)	(0.035)	(0.037)	(0.035)	(0.037)	(0.036)	(0.047)	(0.033)
Ln GDP pc$_{t-1}$	-0.019	-0.019	-0.056	-0.023	-0.005	0.002	-0.068	-0.076
	(0.072)	(0.072)	(0.066)	(0.072)	(0.078)	(0.060)	(0.094)	(0.063)
Splag Atrocities$_{t-1}$	0.645*	0.645*	0.424*	0.665*	0.655*	1.232*	0.862*	0.598*
	(0.149)	(0.149)	(0.161)	(0.150)	(0.151)	(0.153)	(0.152)	(0.158)
t	-34.794*	-25.530*	-22.605*	-40.485*	-46.081*	-36.740*	-25.644*	-28.544
	(0.084)	(0.082)	(0.078)	(0.134)	(0.139)	(0.091)	(0.128)	(0.099)
t^2	5.550*	2.553*	3.314*	20.424*	23.412*	14.853*	3.771*	4.944*
	(0.014)	(0.011)	(0.014)	(0.078)	(0.037)	(0.252)	(0.019)	(0.018)
t^3	-0.241*	-0.062*	-0.134*	-3.311*	-3.737*	-1.816*	-0.151*	-0.235*
	(0.001)	(0.0003)	(0.001)	(0.015)	(0.178)	(0.005)	(0.001)	(0.001)
Temperature$_t$	.	.	-0.006	.	.	.	.	.
			(0.007)					
Ln Precipitation$_t$	.	.	0.038	.	.	.	.	.
			(0.054)					
Polity$^2_{t-1}$	.	.	-0.001	.	.	.	.	.
			(0.002)					
Ethnic Frac.	.	.	-0.134	.	.	.	.	.
			(0.219)					
Gov. Atrocities$_{t-1}$	.	.	0.104*	.	.	.	.	.
			(0.035)					
Constant	0.016	0.016	4.203	0.060	-0.061	-0.255	0.913	0.206
	(1.412)	(1.412)	(2.924)	(1.417)	(1.478)	(1.658)	(1.792)	(1.254)
Observations	333,243	333,243	289,072	333,243	333,243	218,975	90,481	388,830
Log-psuedoikelihood	-1,665.74	-1,665.74	-1,442.85	-1,667.42	-1,689.79	-2,378.39	-781.85	-1,568.17

Note: * indicates $p < 0.05$; $+$ indicates $p < .10$; values in parentheses are clustered standard errors. Year FEs included in Model 1, though not reported here. The GED-Atrocity dependent variable (Model 6) is operationalized as the cell-year sum of fatal (i.e., at least one civilian death) one sided political violence—targeting civilians and excluding government perpetrators—for the countries currently included in the GED data set (i.e., Africa, the Middle East, and Asia — excluding Syria), and for only those cases geo-coded with cell-level precision.

Table A.6: Primary ZINB Robustness Models (Inflation Stage)

	Year FE in Inflation-Stage	**Spatial Lag in Inflation-Stage**	**All Additional Controls**	**Alternative Drought Var.**	**ZIP Model**	**GED-Atrocity Sample**	**Africa Sample**	**Non-Urban Cells Only**
Inflation Stage								
Ln population$_{t-1}$	-0.329*	-0.400*	-0.651*	-0.245*	1.190*	-0.245*	-0.526*	0.111
	(0.125)	(0.063)	(0.219)	(0.057)	(0.131)	(0.053)	(0.112)	(0.138)
Ln travel time$_t$	0.540	-0.765*	0.530	-0.417*	0.850*	0.044	-0.347	-0.913*
	(0.313)	(0.181)	(0.399)	(0.115)	(0.228)	(0.116)	(0.256)	(0.379)
Civil conflict$_{t-1}$	-4.857*	-4.917*	-3.861*	-4.377*	5.682*	0.158	-0.579*	-3.127*
	(0.396)	(0.120)	(0.866)	(0.098)	(0.258)	(0.107)	(0.203)	(0.552)
Urban$_t$	-12.098*	0.029	-4.022	0.017	-0.122	-0.279*	0.292*	0.381*
	(3.462)	(0.022)	(2.838)	(0.056)	(0.022)	(0.069)	(0.024)	(0.106)
Ln GDP pc$_{t-1}$	-2.057*	-0.292*	-2.555*	-0.206*	0.209	0.534*	-1.310*	-0.122
	(0.215)	(0.090)	(0.392)	(0.434)	(0.137)	(0.064)	(0.196)	(0.179)
Polity$_{t-1}$	0.129*	0.156*	0.578*	-0.053*	-0.099*	0.010	-0.425*	0.217*
	(0.033)	(0.016)	(0.116)	(0.011)	(0.020)	(0.011)	(0.052)	(0.038)
Drought$_t$	-2.700*	-0.632*	-1.103	.	1.623*	0.436*	-11.306*	4.038*
	(0.768)	(0.288)	(0.653)		(0.178)	(0.126)	(0.213)	(0.552)
Drought$_t$ Index	.	.	.	0.190*	.	.	.	.
				(0.076)				
Splag Atrocities$_{t-1}$	.	-10.351*	12.764*	.	.	.	.	.
		(0.797)	(1.743)					
Constant	-17.711*	-11.002*	-5.295	-14.539*	45.569*	22.480*	-5.736	-20.077*
	(2.978)	(1.831)	(4.165)	(1.595)	(3.046)	(1.201)	(3.045)	(4.043)
Observations	333,243	333,243	289,072	333,243	333,243	218,975	90,481	388,830
Log-psuedoikelihood	-1,665.74	-1,665.74	-1,442.85	-1,667.42	-1,689.79	-2,378.39	-781.85	-1,568.17

Note: * indicates $p < 0.05$; + indicates $p < .10$; values in parentheses are clustered standard errors. Year FEs included in Model 1, though not reported here. The GED-Atrocity dependent variable (Model 6) is operationalized as the cell-year sum of fatal (i.e., at least one civilian death) one sided political violence—targeting civilians and excluding government perpetrators—for the countries currently included in the GED data set (i.e., Africa, the Middle East, and Asia — excluding Syria), and for only those cases geo-coded with cell-level precision.

Table A.7: **Count Model Estimates of Rebel-Perpetrated Atrocities, 1995-2008 (All Developing Country Grid-Cells)**

	Model 1: Baseline NB	**Model 2: Baseline ZINB**	**Model 3: Medium ZINB**	**Model 4: Full ZINB**
Count Stage				
Drought$_t$	0.334*	0.419*	0.532*	0.338*
	(0.128)	(0.144)	(0.211)	(0.128)
Civil conflict$_{t-1}$	2.133*	0.806*	0.902*	0.236*
	(0.095)	(0.245)	(0.407)	(0.076)
Ln travel time$_t$	0.007	-0.191	0.214	0.036
	(0.153)	(0.260)	(0.352)	(0.099)
Ln cell area$_t$	0.047	-0.008	-0.165	-0.106
	(0.135)	(0.136)	(0.173)	(0.111)
Ln population$_{t-1}$	0.620*	0.323*	0.588*	0.078
	(0.062)	(0.110)	(0.233)	(0.062)
Ln GCP$_{t-1}$	.	.	-0.183	-0.020
			(0.134)	(0.820)
Polity$_{t-1}$	.	.	-0.081*	-0.0003
			(0.029)	(0.007)
Ln border distance$_t$	.	.	-0.378*	0.025
			(0.073)	(0.025)
Urban$_t$	.	.	0.034	0.019
			(0.034)	(0.020)
Cropland$_t$	.	.	-0.010*	-0.001
			(0.003)	(0.002)
Ethnic Diversity$_{t-1}$	.	.	-0.042	-0.045
			(0.075)	(0.034)
Ln GDP pc$_{t-1}$	.	.	0.553*	-0.018
			(0.170)	(0.071)
Splag Atrocities$_{t-1}$	.	.	.	0.648*
				(0.149)
t	.	.	.	-26.825*
				(0.094)
t^2	.	.	.	4.023*
				(0.015)
t^3	.	.	.	-0.164*
				(0.001)
Constant	-0.439	-0.439*	-12.446*	0.002
	(0.758)	(0.758)	(5.557)	(1.394)
Inflation Stage				
Ln population$_{t-1}$	.	-0.371*	-0.426*	-0.325*
		(0.130)	(0.201)	(0.122)
Ln travel time$_t$	.	-0.311	0.089	-0.353
		(0.222)	(0.316)	(0.257)
Civil conflict$_{t-1}$	.	-1.871*	-2.738*	-0.800*
		(0.507)	(0.275)	(0.227)
Urban$_t$	.	0.118*	-0.119	-0.947*
		(0.041)	(0.068)	(0.234)
Ln GDP pc$_{t-1}$	.	.	1.155*	0.758*
			(0.451)	(0.178)
Polity$_{t-1}$	.	.	-0.164*	1.361*
			(0.060)	(0.135)
Drought$_t$	.	.	0.271	0.194
			(0.294)	(0.284)
Constant	-13.543*	-8.191*	-2.266	-19.817*
	(1.278)	(1.859)	(7.380)	(3.519)
Observations	432,350	432,350	389,764	
Log-psuedoikelihood	-9,727.35	-9,630.26	-1,674.74	

Note: * indicates $p < 0.05$; values in parentheses are robust standard errors clustered by cell-id.

Table A.8: List of Developing Countries Included in Sample

Afghanistan	Georgia	Nicaragua
Albania	Ghana	Niger
Algeria	Grenada	Nigeria
Angola	Guatemala	Pakistan
Argentina	Guinea	Palau
Armenia	Guinea-Bissau	Panama
Azerbaijan	Guyana	Papua New Guinea
Bangladesh	Haiti	Paraguay
Belarus	Honduras	Peru
Belize	India	Philippines
Benin	Indonesia	Romania
Bhutan	Iran	Rwanda
Bolivia	Iraq	Saint Kitts and Nevis
Bosnia-Herzegovina	Jamaica	Saint Lucia
Botswana	Jordan	Saint Vincent and the Grenadines
Brazil	Kazakhstan	Samoa/Western Samoa
Bulgaria	Kenya	Senegal
Burkina Faso	Kiribati	Seychelles
Burundi	Korea, People's Republic of	Sierra Leone
Cambodia	Kosovo	Solomon Islands
Cameroon	Kyrgyz Republic	Somalia
Cape Verde	Laos	South Africa
Central African Republic	Latvia	Sri Lanka
Chad	Lebanon	Sudan
Chile	Lesotho	Swaziland
China	Liberia	Syria
Colombia	Libya	Sao Tome and Principe
Comoros	Lithuania	Tajikistan
Congo	Macedonia	Tanzania
Congo, Democratic Republic of	Madagascar	Thailand
Costa Rica	Malawi	Togo
Cote D'Ivoire	Malaysia	Tonga
Cuba	Maldives	Tunisia
Djibouti	Mali	Turkey
Dominica	Marshall Islands	Turkmenistan
Dominican Republic	Mauritania	Tuvalu
East Timor	Mauritius	Uganda
Ecuador	Mexico	Ukraine
Egypt	Moldova	Uruguay
El Salvador	Mongolia	Uzbekistan
Eritrea	Montenegro	Vanuatu
Ethiopia	Morocco	Venezuela
Federated States of Micronesia	Mozambique	Vietnam
Fiji	Myanmar	Yemen
Gabon	Namibia	Zambia
Gambia	Nepal	Zimbabwe

V. Drought and Violence Narratives

Anecdotal evidence is highly suggestive of rebels' use of increased violence to evict civilians and occupy their lands during droughts. For instance, Naxalite rebel groups in the Andhra Pradesh and Chattisgarh states in India (Pandita, 2011), the Karenni National Progressive (KNP) Party in the Loikaw district (Kayah State) in eastern Myanmar (South, 2005; Smith, 1999), and Hutu rebels in Southern Burundi (Lemarchand, 1996; Longman, 1998), have all been reported to (frequently) grab the arable land of peasants to attain food-stuffs and farmers' cattle for consumption, or as a monetary tool for recruiting potential soldiers.

The use of expropriated land for the purpose of self-sustenance has also been exercised by armed groups in the Philippines (Reuveny, 2007), Somalia (the Somali National Movement and Al-Shabaab, Hendrix and Brinkman, 2013), and Nicaragua (the Contras, see e.g. Kay, 2007). These groups have often sought to forcibly expropriate agricultural land from civilians for consumption and production, or—as in the case of Sierra Leone—for recruiting potential combatants who "were more likely to participate if offered money and food" (Hendrix and Brinkman, 2013, 4). The underlying logic to this dynamic of forcible expropriation of land for food consumption by armed actors is emphasized by Hendrix and Brinkman who state that, "[r]ebel movements typically do not grow their own food and depend on voluntary or coerced contributions from the population" (2013, 4). In this sense, the overarching need for food-stuffs from local civilians directly underpins rebels' demands for local resources, and in turn, often provides the justification for the use of atrocities against these same civilian populations.

Indeed, rebels' dependencies on local populations for sustenance frequently spiral into acts of violence against civilians for a number of reasons. Rebel organizations, especially mobile ones, often have trouble controlling local populations, given that "many rebels are merely passing through the countryside, on their way to seek power in towns. Having little in common with the peasantry, and nothing to offer it, they resort to violence as the only way to control it" (Mkandawire, 2002, 181). In these respects, social unfamiliarity between rebels and civilians is argued to be a common feature of contemporary conflicts, and is believed in turn to compel rebels to use violence not only to control civilians, but also to loot resources, including food-stuffs. Indeed, as Mkandawire argues, "[t]he targeted area need not be one with diamonds, but

any from which rebels can extract surplus" (2002, 212). Here, rebels especially use violence to obtain food (i.e., rather than securing cooperation among civilians to obtain this food) in areas designated specifically as "target areas." One example of these latter dynamics comes from Mozambique, where "[i]n the south, RENAMO raided villages for food but rarely tried to establish control over the population. These provinces were mainly destruction areas, where RENAMO just carried out military operations, attacking villages and killing people" (Hultman, 2009, 832-833).

While these food related dynamics are evident in all periods of conflict, drought increases rebels' incentives to use violence to extract surplus. Importantly, droughts cause resource shrinkage, which forces the local population to significantly reduce consumption and change consumption habits. For example, during the drought in Burkina Faso "farmers strove to minimize cash investments in agriculture, but in some cases they were unable to do so because many had consumed all their seed before planting" (Roncoli, Ingram and Kirshen, 2001, 128). Similarly, during droughts in Sudan, "[e]ventually, desperate people will consume toxic plants, and may even rob insect colonies for grain. The consumption of dum palm trees by the Beja represents a form of disinvestment, as the trees provide raw materials for mat and rope making" (Cutler, 1986, 187-188).

As a result, the shrinkage of resources caused by drought has been shown to produce an increase in violence against civilians. For instance, in Darfur, long term desertification and drought has been invoked to explain the massive use of violence by pastoralist Arab militias against agriculturalist groups designed to capture the latter's fertile land (Flint and de Wall, 2008, 40). Similarly, Sabot Land Defense Force rebels in Kenya, who were dependent on the local population for coerced food support, perpetrated atrocities from 2006-2008, a period of decreased precipitation (Theisen, 2012, 82), in order to obtain land and cattle (Simiyu, 2008).

With declines in available resources for consumption and heightened instances of violence, civilians typically either give up their food resources, turn the government for help, or form their own defense forces, which further pushes rebels to use violence in order to prevent the formation of armed opposition. For example, in the Horn of Africa:

> ...In response to increasing violence against the Mukogodo Masai by armed groups,

> the government took a decision to arm home guards for the protection of the communities. Far from this being a solution to the problem, the government decision has led, firstly, to the increase of small arms in the hands of untrained men. Secondly, the home guards are believed to be in the forefront of the raids, though research is needed to substantiate this claim. Thirdly, the experience in Uganda shows that it is not an effective security solution. Fourthly, there is now the problem of the legal control of home-guards and the law which they operate under. There is also no law under which the home guards are issued arms. The only person allowed to issue licence according to the law of Kenya to carry arms is the Chief Licensing Officer...
>
> ...Arms have introduced a new dimension to conflict. Armed Samburu terrorised residents of Laikipia who then felt compelled to protect themselves by acquiring arms. Preliminary research done in Samburu indicates that the Samburu armed themselves after being raided many times by the Turkanas (Mkutu, 2001).

Similar dynamics are evident in Peru, where peasants in many regions form their own civil defense forces, the *rondas companistas*:

> ...for the sole purpose of preventing the continuous robbery of cattle, of crops, house-breaking, assaults and the abuses that are committed against our defenseless wives, by individuals who wander well armed at night... to give us security so we can dedicate ourselves to raising cattle and crops (Gitlitz and Rojas, 1983, 163).

The different motivations for violence against civilians, which intensify during drought, are captured in the model presented in the main paper and supported by the anecdotal evidence presented here. Specifically, this evidence highlights two different motivational pathways—resource shrinkage and the need to prevent the formation of armed opposition—which together compel rebels to use and increasingly commit atrocities against rural civilian populations so as to increase the likelihood with which they can expropriate, and retain control of, croplands during a severe drought.

Aphornsuvan, Thanet. 2007. "Rebellion in Southern Thailand: Contending Histories." Washington: East-West Center Washington.

Ball, D. and D. Mathieson. 2007. Militia Redux: Or Sor and the Revival of Paramilitarism in Thailand. Bangkok: White Lotus.

Beverly, John. 2008. Historical Companion to Postcolonial Literatures: Continental Europe and its Colonies. Edinburgh: Edinburgh University Press chapter Tupac Amaru Rebellion.

Bryden, Matt. 2014. "The Reinvention of Al-Shabaab: A Strategy of Choice or Necessity?" Washington DC: Center for Strategic and International Studies.

Checci, F. and W.C. Robinson. 2013. "Mortality among Populations of Southern and Central Somalia Affected by Severe Food Insecurity and Famine During 2010-2012." Rome: FAO/FEWS NET.

Chongkittavorn, K. 2004. "One Decade and a Year of Violence in the Southern Border: Mysteries of the Problem and Solution." Paper, Faculty of Humanities & Social Science, Pattani University.

Cutler, Peter. 1986. "The response to drought of Beja famine refugees in Sudan." Disasters 10(3):181–188.

Davis, Anthony. 2005. "No End in Sight for Southern ThailandŠs Escalating Insurgency." Jane's Intelligence Review, March 2005.

Davis, Anthony. 2010. "Borderline support - Malaysia and Indonesia aid Thai insurgency." Jane's Intelligence Review, 16 July 2010.

Ellenbogen, Gustavo G. 1999. The Shining Path: A History of the Millenarian War in Peru. Chapel Hill: University of North Carolina Press.

Eynde, O.V. 2011. "Targets of Violence: Evidence from India's Naxalite Conflict." Working Paper, STICERD and EOPP, London School of Economics and Political Science.

Ferris, Elizabeth. 2011. "The Politics of Protection: The Limits of Humanitarian Action." Brookings Institution Press.

Flint, Julie and Alex de Wall. 2008. Darfur: A New History of A Long War. London: Zed Books.

Galindo, Alberto Flores. 2010. In Search of an Inca: Identity and Utopia in the Andes. Cambridge: Cambridge University Press.

Galindo, Alberto Flores. 2015. Famine in Somalia: Competing Imperatives, Collective Failures. London: Hurst Publishers.

Gartenstein-Ross, D. and T. Vassefi. 2011. "Somalia's Drought, America's Dilemma." The Atlantic (July 5).

Gawande, K., D. Kapur and S. Satyanath. Forthoming. "Renewable Natural Resources Shocks and Conflict Intensity: Findings from India's Ongoing Maoist Insurgency." Journal of Conflict Resolution .

Gitlitz, John S and Telmo Rojas. 1983. "Peasant Vigilante Committees in Northern Peru." Journal of Latin American Studies 15(1):163–197.

Gregory, Christopher. 2013. The Modern Anthropology of India: Ethnography, Themes and Theory. Abington, UK: Routledge chapter Chhattisgarh: At the Crossroads.

Gunaratna, R., A. Acharya and S. Chua. 2005. Conflict and Terrorism in Southern Thailand. Singapore: Marshall Cavendish Academic.

Hansen, Stig Jarle. 2013. Al-Shabaab in Somalia: The History and Ideology of a Militant Islamist Group, 2005-2012. London, UK: Hurst and Co.

Helbardt, S. 2011. "Deciphering Southern Thailand's Violence: Organisation and Insurgent Practices of BRN-Coordinate." Ph.D. thesis, University of Passau, Germany.

Hendrix, Cullen S. and Hen-Jan Brinkman. 2013. "Food Security and Conflict Dynamics." Stability: Internatioal Journal of Security and Development 2(2).

Hultman, Lisa. 2009. "The Power to Hurt in Civil War: The Strategic Aim of RENAMO Violence." Journal of Southern African Studies 35(4):821–834.

Human-Rights-Watch. 2007. "No One is Safe: Insurgent Attacks on Civilians in Thailand's Southern Border Provinces." New York: Human Rights Watch.

Human-Rights-Watch. 2013. "Hostages of the Gatekeepers: Abuses against Internally Displaced in Mogadishu, Somalia." New York: Human Rights Watch.

Janchitfah, S. 2004. Violence in the Mist: Reporting on the Presence of Pain in Southern Thailand. Bangkok: Kobfai Publishing Project.

Kay, Cristóbal. 2007. "Land, Conflict, and Violence in Latin America." Peace Review: A Journal of Social Justice 19(1):5–14.

Lemarchand, Rene. 1996. Burundi: Ethnic Conflict and Genocide. Cambridge, UK: Cambridge University Press.

Lindley, Anna. 2014. "Questioning 'drought displacement': environment, politics and migration in Somalia." Forced Migration Review 45:39–43.

Liow, Joseph Chinyong and Don Pathan. 2010. "Confronting Ghosts: Thailand's Shapeless Southern Insurgency." Lowy Institute Paper 30, Double Bay, NSW: Lowy Institute for International Policy.

Longman, Timothy Paul. 1998. Proxy Targets: Civilians in the War in Burundi. New York, NY: Human Rights Watch.

Masterson, Daniel M. 1991. Militarism and Politics in Latin America: Peru from Sánchez Cerro to Sendero Luminoso. New York: Greenwood Press.

McCargo, D. and Ukrist Pathmanand. 2005. The Thaksinization of Thailand. Copenhagen: NIAS.

McKenzie, David. 2011. "Somalis Fear Tyranny of Al-Shabaab as they Flee Drought-striken Areas." CNN News, September 2011, http://www.cnn.com/2011/WORLD/africa/09/05/somalia.al.shabaab.drought/.

Mkandawire, Thandika. 2002. "The Terrible Toll of Post-Colonial 'Rebel Movements' in Africa: Towards an Explanation of the Violence against the Peasantry." Journal of Modern African Studies 40(2):181–215.

Mkutu, Kennedy. 2001. "Pastoralism and conflict in the Horn of Africa." Africa Peace Forum/Saferworld/University of Bradford.

Montesano, M. and Patrick Jory. 2008. Thai South and Malay North: Ethnic Interactions on a Plural Peninsular. Singapore: NUS Press.

National-Statistics-Office. 1985. "Statistical Yearbook of Thailand, 1985." Bangkok: Office of the Prime Minister.

National-Statistics-Office. 2010. "Socio-Economic Survey Data Tape." Bangkok: Office of the Prime Minister.

NREGA. 2010. "NREGA annual reports 2004-2010." Ministry of Rural Development.

Pandita, Rahul. 2011. Hello, Bastar: the untold story of India's Maoist movement. Chennai: Tranquebar Press.

Poole, D. and Gerardo Rénique. 1992. Peru: Time of Fear. New York: Latin American Bureau.

Raja, D. 2008. The Naxal Challenge : Causes, Linkages and Policy Options. New Delhi: Dorling Kindersley chapter The Naxal Movement: A Realistic Approach.

Ramakrishnan, Venkitesh. 2010. "Flawed Operation." Frontline 27(9):4–9.

Ramana, P.V. 2008. The Naxal Challenge: Causes, Linkages and Policy Options. New Delhi: Dorling Kindersley.

Rao, C. Bhaskara. 2010. The Problem of Fragmentation in the Naxalite Movement. Delhi: Wordsmiths.

Rattanachaya, K. 2004. Revealing the Igniting of the Southern FireŮEstablishing a Pattani State. Bangkok: Phichit Printing.

Ray, Rabindra. 2002. The Naxalites and Their Ideology. New Delhi: Oxford University Press.

Reuveny, Rafael. 2007. "Climate change-induced migration and violent conflict." Political Geography 26:656–673.

Roncoli, Carla, Keith Ingram and Paul Kirshen. 2001. "The costs and risks of coping with drought: livelihood impacts and farmers' responses in Burkina Faso." Climate Research 19:119–132.

Shankar, P. 2006. Yeh Jungle Hamara Hai. Delhi, India: New Vistas.

Simiyu, Robert Romborah. 2008. "Militianisation of resource conflicts The case of land-based conflict in the Mount Elgon region of Western Kenya." Monograph 152, Institute for Security Studies, October 2008.

Simpson, J. 1993. In the Forests of the Night. New York: Random House.

Singh, Parakash. 2006. The Naxalite Movement in India. New Delhi, India: Rupa Publications Ltd.

Smith, Martin. 1999. "Ethnic Conflict and the Challenge of Civil Society in Burma." Presented at the conference "Strengthening Civil Society in Burma. Possibilities and Dilemmas for International NGOs," 1997. http://www.ibiblio.org/obl/docs3/smithpaper.htm.

South, Ashley John. 2005. Mon Nationalism and Civil War in Burma: The Golden Sheldrake. London: RoutledgeCurzon.

Srirai, S. 2008. "The BRN-Coordinate Movement and the Insurgency in the 3 Border Provinces and 4 Districts of Songkhla Province in the Period 2005-2007." PhD dissertation, National Defence College, Thailand.

Sundar, Nandini. 2007. Subalterns and Sovereigns: An Anthropological History of Bastar (1854-2006), 2nd Edition. Delhi: Oxford University Press.

Theisen, Ole Magnus. 2012. "Climate clashes? Weather variability, land pressure, and organized violence in Kenya, 1989-2004." Journal of Peace Research 49(1):81–96.

Walker, C.F. 1999. Smoldering Ashes: Cuzco and the Creation of Republican Peru. Durham: Duke University Press.

Zimmerman, K. 2011. "Al Shabaab and the Challenges of Providing Humanitarian Assistance in Somalia." Statement before the House Committee on Foreign Affairs; Washington DC: American Enterprise Institute.