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How Effective is the Formalization of Land Rental Agreements for Dispute Prevention? Evidence from a Randomized Controlled Trial in an Ugandan Refugee Camp

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How Effective is the Formalization of Land Rental Agreements for Dispute Prevention?

Evidence from a Randomized Controlled Trial in an Ugandan Refugee Camp

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ABSTRACT. The number of refugees and internally displaced persons worldwide is increasing. Building good relationships between refugees and host communities is crucial for the welfare of both parties. This study investigates whether formalizing land rental agreements is effective in reducing land disputes and increasing access to land for refugees. We conducted a randomized controlled trial in the Rhino refugee camp and surrounding communities, where refugees informally rent land from Ugandans, and there are land disputes. We provide an intervention that promotes the formal documentation of land rental contracts for randomly selected refugees and Ugandans. We also measured preferences, including trust and altruism, to determine whether they affected conflict experience and land transactions. We found weak evidence that the formalization of land rental contracts reduces the probability of experiencing land-related conflicts, but the size of the rented-in parcel is smaller for refugees in the treatment groups. We also did not observe any significant impact of the treatment on household income or physiological distress among refugees. Our findings underscore the importance of considering not only tenure security but also land accessibility for refugees to improve their welfare.

KEY WORDS: Refugees; Informal land markets; Contract formalization; Randomized controlled trial; Uganda

JEL CLASSIFICATION: C93, D74, K12, O12, Q12, Q15

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Introduction

The number of refugees and internally displaced persons has increased worldwide. According to the United Nations High Commissioner for Refugees (UNHCR), in the end of 2024, 123.2 million individuals were forcibly displaced worldwide as a result of persecution, conflict, or generalized violence (UNHCR, 2024). In particular, the refugee population in Sub-Saharan Africa (SSA) increased by 1.1 million (22 percent) in 2017, mainly because of the crisis in South Sudan, where more than one million people fled primarily to Sudan and Uganda (UNHCR, 2018). As of 2024, more than 1.8 million refugees and asylum seekers reside in Uganda (UNHCR, 2024).

Historically, Uganda has adopted an open-door policy for new refugee arrivals, which gives refugees freedom of movement, the right to work and establish a business, and access to social services. The Ugandan government allocates a small piece of agricultural land and allows refugees to rent land from local communities near refugee settlements (host communities). Despite Uganda's favorable environment, however, refugees face numerous challenges, including a shortage of education and health services, environmental degradation and energy shortages (especially firewood), food insecurity, and insufficient access to agricultural land (UNHCR, 2018). As many refugees are farmers in their original countries, enhancing access to agricultural land is important for

improving their livelihoods and promoting their economic independence (Zhu et al., 2024). At the same time, developing a peaceful relationship between refugees and host communities is crucial for the welfare of both parties.

A growing body of literature examines the economic and social impact of refugee inflow on host communities (Verme & Schuettler, 2021), including the consumption and income of the hosts (Alix-Garcia et al., 2018; Taylor et al., 2016; Zhu et al., 2024), food prices (Alix-Garcia & Saah, 2010), the labor market (Maystadt & Verwimp, 2014; Tsuda, 2022), child health (Baez, 2011), environmental degradation (Maystadt, Mueller & Van Den Hoek, 2020), and host communities' sentiments toward refugees (Barros, 2025; Higuchi et al., 2025). Several studies have also investigated the economic livelihoods of refugees (Alix-Garcia et al., 2019; Alloush et al., 2017). However, only a few studies have addressed the issue of access to agricultural land. One exception is Adong et al. (2021) who found that hosts' higher trust levels were associated with their engagement and willingness to rent land to refugees in Uganda.

The main objective of this study is to investigate the impact of formalizing land rental agreements between refugees and host communities on conflict experiences and refugees' access to land. We conducted a randomized controlled trial (RCT) in Rhino Camp, Arua District, Uganda, where refugees have rented farmland from host

communities, but some of them have experienced land-related disputes, such as termination of the rental contract before tenants harvest crops. As there is no effective mediation mechanism, local NGOs have recently introduced and implemented formalized land rental agreements in the camp. Both tenants (refugees) and landlords (Ugandans) sign an agreement stating the rental fee and period in front of village chiefs and refugee block leaders, who play the role of witnesses and mediators. Although this seems to reduce land disputes and increase refugees' access to land, it is not compulsory. As there is a transaction cost of signing an agreement, landlords may refuse to rent land to refugees demanding a formal agreement. We randomly assigned refugees into two groups: (1) the control group, which did not receive any intervention (105 refugees), and (2) the treatment group, which received detailed information and support for making a formal land rental agreement (203 refugees). We also provided information regarding formal land rental agreements to randomly selected Ugandans who potentially can rent land to refugees.

We estimated the intention-to-treat effect (ITT) of the treatment and the local average treatment effect (LATE) of the formal land rental agreement on access to land, conflict experience, income, and psychological distress of refugee households. If the intervention improves access to land and reduces conflicts, the income of refugees may increase, and their psychological distress may decrease. We find that the formalization of agreements

reduces land-related conflicts. At the same time, however, the formalization of the agreement was found to reduce the size of the rented land for refugees. We found no statistically significant relationship between the treatment and income or psychological distress.

Following Adong et al. (2021), who show that higher levels of trust are significantly associated with hosts' willingness to engage in land transactions, and motivated by our field observations suggesting that Ugandans may rent out land for altruistic reasons[1], we examine whether individual preferences—such as trust and altruism—influence conflict experiences and participation in land transactions. We find that Ugandans' trust and altruism are positively associated with the probability of signing a formal rental agreement. Moreover, trust is also negatively associated with experiences of land-related conflict by both refugees and Ugandans, suggesting its important role in shaping the land rental markets between refugees and host communities.

This study contributes to several strands of the development economics literature. First, it addresses a large body of research on property rights and tenure security. A long tradition in economics argues that stronger land property rights improve welfare by

[1] While Ugandan hosts rent out land, some do so without charging rental fees.

reducing expropriation risk and incentivizing investments (Aberra & Chemin, 2021; Besley, 1995; Deininger, Ali, et al., 2008; Di Falco et al., 2020; Goldstein & Udry, 2008). Experimental and quasi-experimental evidence has shown that land titling and formalization can increase labor market participation (Field, 2007), encourage investment, and enhance land market efficiency (Deininger, Jin, et al., 2008; Holden et al., 2011). However, research examining tenancy reforms highlights the complex trade-off between protecting existing tenants and maintaining the functioning of land rental markets. For example, rent regulation, which aims to improve the bargaining power of tenants by capping rents and preventing arbitrary evictions, reduced landlords'willingness to rent out land and decreased land access for the poorest groups in South India (Besley et al., 2016). Granting ownership rights to long-term tenants in India increased eviction among the poorest laborers before they gained legal protection because landlords feared that renting land might lead to future ownership claims (Besley & Burgess, 2000). Our study departs from this literature by focusing on tenants in a fragile refugee–host setting, where traditional institutions governing communal land cannot be relied upon to mitigate land disputes. We provide the first experimental evidence that the formalization of rental agreements may reduce vulnerable groups' access to land.

Second, this study contributes to research on land rental markets and contract

enforcement. Previous studies have documented how land rental markets can improve allocative efficiency when transaction costs are low and contracts are credible (Ackerberg & Botticini, 2002; Macours et al., 2010). In SSA, land conflicts reduce agricultural productivity (Mugizi & Matsumoto, 2021; Mwesigye & Matsumoto, 2016), and the functioning of rental markets is often constrained by tenure insecurity and weak enforcement (Holden et al., 2011). We show that introducing a simple formalization mechanism can reduce contract breaches but simultaneously reduce the amount of land refugees can cultivate. Our results also suggest that landlords with higher levels of trust are less likely to experience conflicts, highlighting the role of social capital in reducing transaction costs.

Finally, this study adds to the nascent economic literature on refugees and their displacement. As discussed, many prior studies have examined the impact of refugee inflows on host communities, but little is known about how institutional reforms shape refugees' livelihoods and access to productive assets. We provide the first randomized evaluation of a contract formalization program in refugee–host land rental markets, thereby bridging the gap between the property rights literature and refugee economics. Our findings underscore the importance of considering distributional consequences when designing interventions to improve tenure security in fragile contexts.

The remainder of this paper is organized as follows. Section 2 describes the study site, data collection, and experimental design. Section 3 explains our estimation method and Section 4 presents the results. Section 5 provides a theoretical explanation of the empirical results. Finally, Section 6 concludes the study**.**

2. Data and Intervention

2.1 Study Site

The Rhino camp was opened in 1994, and currently 115,000 refugees, mainly from South Sudan, live in the camp (see Appendix Figure 1 for the map of the camp). Most refugees arrived at the camp in 2016-17. As of January 2020, approximately 20-30 refugees arrive at the camp daily. When refugees arrive at the camp, they are allocated a piece of land and materials for the tent (tarpaulin). Although they used to allocate 50m x 50m of land for both residential and cultivation purposes, currently, the initial allocation of land has been reduced to 30m x 30m due to the increased scarcity of land. Refugees receive food aid of 12 kg of maize, 3 kg of beans, and 2.5 liters of cooking oil or 31,000 UGX (8.6 USD) per person per month (as of January 2020). Refugees are allowed to engage in economic activities, and some engage in petty businesses such as making bricks, selling food, and tailoring.

Refugees are also allowed to rent or borrow land from Ugandan nationals in the host communities, and some of them grow sesame, sorghum, rice, and other crops. However, according to our field observations, disputes related to land rental agreements exist between refugees and local Ugandans. Examples include animal damage to crops; disputes about contract durations; double renting, where owners rent out the same piece of land to more than one refugee; and disputes related to the payment of land rental fees, including both rent increases by owners after the agreement and the failure of refugees to pay the rent.

To solve these problems, the Office of the Prime Minister (OPM) of Uganda and an NGO called the Norwegian Refugee Council (NRC) provide support for formalizing land rental agreements. There are two types of support. The first is to provide a format for land rental agreements. Refugees and Ugandans are supposed to sign a document with witnesses from the block or village leaders of both refugees and local Ugandans themselves. The other type of support is called "due diligence." In due diligence, a third-party investigator (e.g., NRC) visits the field and confirms the owner and size of the land. The tenant, landlord, refugee block leader, and local Ugandan village leader then sign a formal document together with the third-party investigator. Therefore, the formalization of land rental contracts can increase the enforcement of the contract.

However, these formal rental agreements are not popular at the study site. One possible constraint is the availability of information for refugees and local Ugandans. Another possible constraint is the transaction cost of obtaining a formal agreement. For refugees or local Ugandans to sign the document, they must physically visit both the refugee and Ugandan leaders and understand the details of the contract. These transaction costs, including the preparation of formal documents, language barriers, and physical transport, may be sufficiently large to hinder formal land rental agreements.

2.2 Data Collection

This study consisted of a baseline survey in January–February 2023, an intervention in March–April 2023, and a follow-up survey in January–February 2024 for the two populations. The first population is refugee households engaged in agricultural production (we exclude refugees who do not engage in crop production, but according to the pre-test and interviews with informants, most of the households engage in crop production), and the second population is Ugandan households that reside in villages near the refugee camp. Stratified random sampling was performed, where the strata were the village for Ugandans and the block for refugees.

First, we conducted a survey of 308 refugee households in seven blocks (44 refugee

households in each block) in Rhino refugee camp and 68 Ugandan households in the surrounding villages.[2] We selected seven blocks in refugee camp where the NRC did not provide formal land rental agreement services. This is because, in the blocks covered by the NRC, some refugees had already received assistance for the formal rental agreement, and thus, the difference between the control and treatment groups would be ambiguous. Note, however, that even residents in the blocks not covered by the NRC can be involved in due diligence with the NRC as long as they can contact the NRC either directly or through other local NGOs, although this is rare.

We requested the office managing refugees in Uganda, namely the OPM, and village leaders to provide a list of the names of refugee households and randomly selected 44 refugee households to be interviewed in each block; of these, 29 households were randomly assigned to the treatment group and 15 were assigned to the control group, generating a total sample size of 308 refugee households (203 treatment households and 105 control households). We conducted a power calculation to determine the sample size based on our preliminary survey before the baseline.[3] The main respondent was either

[2] The refugee camp is divided by zone, which is further divided into blocks.

[3] The sample size was determined by power calculation based on the preliminary interviews in Tika, Odobu, Siripi, and Ofwa zones. Although these villages were not the same as the sample blocks, the situation is comparable to our sample villages according to our local research assistance. Among 18 refugee households whom we interviewed in the preliminary survey, 12 refugees have rented-in land

the head of the household or the person who was mainly engaged in agricultural production (especially the one who decided to rent land).

Regarding Ugandan households, we selected potential landlords who owned land of more than 2 ha in the surrounding Local Council 1s (LC1s)[4] with the assistance of the LC1 chairperson, but the final sample included those with a smaller size of owned land (with a minimum of about 1 ha). We interviewed four Ugandan landlords from 17 surrounding villages (68 Ugandan households). We then randomly selected half of the villages and provided the same information as that provided to the treatment group of refugees (i.e., the importance of a formal land rental agreement and how to implement it). Randomization was performed at the household level for refugees and at the village level

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so far. Among those who rented the land, six refugees have experienced conflicts with the landlord, suggesting that about 50% of tenants have experienced conflicts. Thus, we assumed that the probability of experiencing conflicts without a formal contract is 50%. Based on discussion with local NGOs and research assistance, we presumed that 50% of treated farmers would sign the formal land rental contract, while 10% of farmers in the control group would do so. Thus, the probability of conflicts for control group was 0.9 x 0.5=0.45 while the probability of conflicts for the treatment group was 0.5 x 0.5=0.25. For us to detect the impact of treatment to reduce the probability of experiencing conflicts from 0.45 to 0.25, we need a sample size of 100 for each control and treatment group. Since our intervention took a form of invitation, participation was up to the subjects. As we presumed that 50% of treatment households make a formal land rental agreement, we sampled 200 treatment households. Given that we conducted our survey in seven blocks, we selected the same number of households from each block, so that our sample size of treated households is 203 (29 households in each block) and that of control households is 105 (15 households in each block).

[4] Local Council 1 is the lowest administrative unit in Uganda. It is equivalent to a village that consists of 50-70 households.

for Ugandans. Therefore, our sample and randomization are not based on landlord-tenant combinations at the baseline, as tenants can rent land not only from a specific landlord.

During both the baseline and endline surveys, we collected information on basic household characteristics, experience of land disputes, access to land, and income in the past 12 months (1st and 2nd cropping seasons of the previous year). Following Falk et al. (2018), we asked questions related to economic preferences including trust and altruism. Data on psychological distress were collected using a questionnaire incorporating the K6 scale (Kessler et al., 2002). The K6 is a six-item self-report scale designed to assess nonspecific psychological distress experienced during the past 30 days, focusing on symptoms of anxiety and depression (see Appendix A1 for questions asked regarding preferences and psychological distress). Appendix Tables 1 and 2 provide descriptive statistics of the variables used in the analyses for refugees and Ugandans, respectively. Since the questions included sensitive information, such as experiences of conflicts, before the baseline survey, we obtained consent from the interviewees by explaining our intention, that our survey was purely for academic purposes, and that their private information would never be disclosed. Ethical clearance was obtained from the AIDS Support Organization (TASO) which reviewed the ethical issues of various types of research in Uganda. We registered our survey with the RCT registry of the American

Economic Association.

In the endline survey, we interviewed 285 refugees and 65 Ugandan households, as 22 refugee households were not available, mainly because they had moved out of the camp or were temporarily not available at the time of the survey. We excluded one observation from the Ugandans who had extreme values in key variables, and our sample size became 285 refugees and 64 Ugandans. In Appendix Table 3, we estimate an attrition probit model for refugees, where the dependent variable is a dummy variable that takes the value of one if we were able to interview a refugee household in the endline, and the independent variables are the basic household characteristics and preferences of the respondent. We found that a few variables, including the treatment status dummy, household size, the female-headed household dummy, language ability, and the village dummy, were statistically significant. Thus, we applied the inverse probability weighting method for subsequent analyses.

2.3 Intervention

Interventions for refugee households include the provision of information about the formal land rental agreement (its benefits and procedure) and supporting services to make formal agreements, such as translation of the form and arrangements among all people

who sign the form (landlord, LC1 chairman, and refugee block leader). We also provided translation/interpretation and transportation support for due diligence, where both the tenant and landlord visited the field together and checked the size and quality of the land. More specifically, we hired four paralegals and invited the treatment households to a block-level meeting where we explained the importance of a formal land rental agreement and how to implement it. We then held another block-level meeting to provide support for making a contract. We asked them to see our staff on a specific date with their landlord and provided some support (e.g., translation and transportation for due diligence) to make a formal agreement. All sessions were conducted in South Sudanese language. The intervention for Ugandan households involved providing information about the formal land rental agreement (its benefits and procedure). The intervention protocol is presented in Appendix A2.

Given that the treatment for refugees was at the household level, but not at the block level, one may argue that there was a spillover to the control group. Information on formal land rental agreements can be spread from the treatment to the control households. However, the support provided in the intervention to reduce the cost of formalization is specifically targeted at the treatment group and cannot be utilized by the control group. Thus, the impact estimated in this study is mainly from this support, not the information

provision.

3. Estimation Methods

At the study site, refugees tend to rent more than one parcel from different landlords residing in different LC1s. Similarly, landlords normally rent out land to multiple tenants in different blocks of the camp. Based on this, the intervention was not provided to refugee–landlord pairs. This means that the treatment refugees (landlords) who would like to formalize the rental agreement request the control landlords (refugees) who would know nothing about the formalization. Thus, we need to evaluate the effect of the intervention on the household-level total land accessed by refugee households and the household-level total land rented out by Ugandan landlords. However, the relationship between landlords and refugee tenants and parcel characteristics, which are expected to affect conflict incidence and contract formalization, cannot be examined using household-level analyses. Therefore, we conducted analyses at both the household and parcel levels separately for refugees and Ugandans.

3.1 Household-Level Estimation Methods for Refugees

We first estimated the ITT of the intervention on the outcome variables of interest for

refugees by estimating the following equation:

$$Y_{i\ endline} = \alpha + \beta D_i + \gamma Z_{i\ baseline} + \delta Y_{i\ baseline} + \omega_i \quad (1)$$

The main variable of interest is the treatment status dummy (D_i), which takes the value of one if a refugee household is assigned to the treatment group and zero to the control group. The dependent variables, $Y_{i\ endline}$, include a set of dummy variables related to formal land rental agreements and conflict experience, each taking the value of one if the refugee had a specific experience and zero otherwise. These include making a formal land rental agreement, experiencing any land-related disputes with Ugandans, experiencing crop damage caused by the animals owned by Ugandans, a breach of contract regarding the duration of the agreement, incidents of double renting, or a breach of contract concerning the rental fee, including both rent increases by the landlord and failure to pay rent as agreed by refugees in the last year. Among these types of conflicts, only those related to rental fees could potentially originate from both tenants and landlords.

We also examined the impact of the treatment on refugees' access to land, income, and psychological distress. Specifically, we analyzed the following indicators: the total size of land accessed (ha), whether the refugee could rent land (dummy), size of rented-in land (ha), size of rented-in land to which access was lost (ha), and size of rented-in

land to which access was newly gained (ha)[5]. Regarding economic and mental outcomes, we considered household income net of remittances (USD)[6] and psychological distress measured on the K6 scale (ranging from 0 to 24, with higher scores indicating greater distress).

As baseline household characteristics ($Z_{i\ baseline}$), we controlled for household size, female-headed household dummy, years of schooling of the household head, age of the household head, value of livestock (USD), and value of household assets (USD). In addition, length of stay in the camp (months) and household members' language ability in English, Swahili, and Ugandan, as these languages can be used to communicate with local Ugandans are included in Z as they can decrease the transaction cost of contract agreement and the probability of experiencing land disputes. We also controlled for the baseline outcome variables of refugee household *i* ($Y_{i\ baseline}$) to account for differences in the initial performance so that we estimate the Analysis of Covariance (ANCOVA) models (McKenzie, 2012). We also controlled for preference variables, including trust and altruism, which ranged from 0 to 10, with higher scores indicating stronger preferences. Standard errors were clustered at the block level. As the number of clusters

[5] We did not explicitly ask whether parcel size changed when the same parcel rented in 2022 was rented again in 2023.We therefore assume that parcel identity and size remain unchanged across survey rounds. This assumption is partly supported by follow-up inquiries suggesting that changes in rented parcels are relatively uncommon.

[6] We use an exchange rate of 1 USD = 3,689.82 UGX for both survey rounds.

(seven blocks) is small, we also report the wild bootstrap *p*-value for the treatment status dummy.

We then estimate the LATE for the effect of formal land rental agreements on dispute experience, land size, and income variables using the treatment status dummy (D_i) as an instrumental variable for formalizing the land rental agreement (X_i).

$$Y_{i\ endline} = \alpha + \beta X_i + \gamma Z_{i\ baseline} + \delta Y_{i\ baseline} + \varepsilon_i \qquad (2)$$

Since the number of clusters is small, cluster-robust standard errors at the village level may be unreliable. We therefore report heteroskedasticity-robust standard errors and conduct inference using wild cluster bootstrap *p*-values at the village level.

3.2 Parcel-Level Estimation Methods for Refugees

Additionally, we estimate the impact of treatment on transactions at the parcel level.

$$Y_{jio\ endline} = \alpha + \beta D_i + \gamma R_{io\ endline} + \delta Z_{ji\ baseline} + u_{ijo}$$

Here, the dependent variables include whether the transaction for parcel *j* between refugee *i* and owner *o* was documented or not, the size of the parcel, the natural log of rent per hectare, whether there was any trouble related to the transaction, and whether the tenant failed to pay rent as agreed. In the endline survey, we failed to capture the contract breach variable at the parcel level, and collected this variable in an additional survey conducted

in 2025. Thus, for this variable, the sample size was smaller than that for the other variables. Our main variable of interest is the dummy variable that takes the value of one if the refugee is in the treatment group (D_i). We also included relationship variables between the refugee and the owner (R_{io}), including whether they are friends and whether the owner was introduced by a friend. We added parcel and household characteristics as in the household-level analyses (Z_{ji})[7]. We controlled for village fixed effects, and the standard errors are clustered at the household level.

3.3 Household-Level Estimation Methods for Ugandans

For Ugandans, we estimated a model similar to the ITT for refugees. The main variable of interest is the treatment status dummy, which takes the value of one if a Ugandan household resides in the village assigned to the treatment group. The dependent variables include a dummy variable that takes the value of one if a Ugandan household rented out land to refugees, the size of the rented-out parcel (ha), the change in the size of the rented-out parcel from baseline to the endline (ha), a dummy variable that takes one if the renting-out transaction was documented, a dummy variable that takes one if Ugandans

[7] As parcel characteristics, we include whether it is a newly accessed parcel, the starting year of the parcel use, distance from the parcel to the home (km), soil type (loam, sandy, rocky, and clay), soil quality (good, normal, poor), and slope (steep, moderate, and flat).

faced any trouble related to land with refugees, and a dummy variable that takes one if the tenant failed to pay rent. We control for language ability in English, Swahili, and the Sudanese language, household characteristics, and preferences, as we do for the ITT estimation for refugees. Standard errors are clustered at the LC1 level, and we report wild cluster bootstrap *p*-values to account for the small number of clusters. However, for the analysis of Ugandans, the results should be interpreted as supplementary because of the small sample size.

3.4 Parcel-Level Estimation Methods for Ugandans

We estimated a similar parcel-level model for Ugandans. Here, the dependent variable is a dummy variable that takes one if the renting-out transaction for the parcel is documented, the size of the rented-out parcel (ha), the log of rental fee, and a dummy variable that takes one if any problems occurred during the transaction, and one if the tenant failed to pay the rental fee. We control for the same parcel characteristics as in the parcel-level analyses of refugees and household characteristics as in the household-level analyses of Ugandans. Standard errors are clustered at the LC1 level, and we report wild cluster bootstrap p-values given the small number of clusters.

4. Results

4.1 Results for Refugees

Table 1 presents the conflict experiences, land rental agreements, and incomes of refugee households at both the baseline and endline surveys. To assess the severity of these issues, the 2022 baseline survey asked about lifetime experiences of conflict with the question "Have you ever experienced …?" In contrast, the endline survey asked, "Did you … in the last year?", to measure occurrences over the past 12 months and evaluate the impact of the intervention. Therefore, the figures from the baseline and endline surveys were not fully comparable.

In the baseline survey, as many as 43% of refugees reported having encountered land-related disputes with Ugandans, with the most common issue being crop damage caused by animals owned by Ugandans (33 %). Notably, 13% of refugees had experienced a breach of contract regarding the rental duration. The share of refugees reporting the experiences of double renting was 18% and that of conflict over rental fees was 17%. In the endline, 47% of people experienced some trouble with Ugandans related to land in the last year. Among them, 35% of refugees experienced crop damage by animals owned by Ugandans, 2% experienced contract breaches on the duration of the rental agreement, 3% experienced double renting, and 10% experienced conflict breaches over the land

rental fee.

By the baseline survey, 8% of refugees had made a formal land rental agreement. In 2023, during the intervention, 46% of refugees made formal land rental agreements and 44% of refugees performed due diligence. The size of the total parcel accessed was 0.41 ha at the baseline, and it increased to 0.45 ha. The size of the rented-in parcels increased from 0.26 ha to 0.30 ha. The size of rented-in parcel that lost access in 2023 was 0.04 ha while the size of rented-in parcel that gained access was 0.08 ha. The household income net of remittance is 373.0 USD in 2022, and that in 2023 was 364.8 USD. Psychological distress measured in the K6 was 10.72 in the baseline and 10.99 in the endline survey. These figures illustrate the severity of the living conditions faced by refugees.

Table 2 compares the mean differences between the treated and control groups at the endline. At the endline, 54% of farmers in the treatment group entered into a formal contract agreement compared to 30% in the control group, and the difference was statistically significant. Also, farmers who experienced due diligence were 53% in the treated group, while it is 27% in the control group. This suggests that the treatment successfully encouraged farmers to make formal land rental agreements and perform due diligence activities. Because due diligence was conducted in nearly all formalized contracts and the results are quantitatively the same, the following analysis focuses

exclusively on formalization. The probability of experiencing contract breach on the duration of the agreement and that of double renting are lower for the treated group than the control group by 3.8 percentage points respectively, suggesting that a formal land rental agreement reduces the probability of experiencing conflicts. The size of the rented-in parcels that gained access was smaller for the treated group than for the control group by 0.041 ha, and the difference was statistically significant. We did not observe any significant differences in household income or psychological distress between the treatment and control groups.

Before estimating the ITT, we conducted balancing tests of baseline household characteristics and outcome variables for the treated and control group households. As shown in Appendix Table 4, we observed no statistically significant differences between treatment and control groups, except that language ability was statistically different at 10%, suggesting that two groups were largely well balanced. We control for these baseline outcomes and household characteristics in the following analyses.

Table 3 shows the ITT estimates for the impact of treatment on formal land rental agreements and the experience of conflict for refugee households. The coefficient on the treatment dummy is 0.234 for the probability of making a formal land rental agreement and is statistically significant at the 5% level. This result remains statistically significant

when using wild cluster bootstrap p-values. This suggests that the treatment encouraged refugee households to make formal land rental agreements. The coefficient of the treatment dummy for the experience of contract breach regarding the duration of the rental agreement is -0.040, and the wild bootstrap p-value is significant at 15%, suggesting that the treatment decreases the probability of experiencing contract breach on the duration, although the evidence is statistically weak. No significant coefficients were observed for other types of conflict.

Trust has a negative and statistically significant coefficient at the 5% level, while altruism has a positive and statistically significant coefficient at the 10% level for experiencing double renting. This suggests that refugees with higher levels of trust are less likely to experience double renting, whereas more altruistic refugees are more likely to experience it. While it may seem counterintuitive that altruism among tenants is associated with double renting. One possible explanation is that more altruistic refugees may be less likely to contest or refuse arrangements offered by Ugandan landlords, even when the same plot is rented to multiple tenants. However, the positive coefficient on altruism becomes statistically insignificant in the LATE estimation reported in Table 5, suggesting that the effect of altruism is not robust across specifications. Contrary to our expectations, language ability has a positive and significant coefficient on double renting.

One possible interpretation is that better language ability improves mutual understanding of contractual terms, making agreements more clearly recognized by both parties. As a result, deviations from these agreements may be more readily perceived as violations, which could increase the likelihood of reported double renting.

Table 4 presents the ITT estimates for the impact of treatment on access to land, income, and psychological distress. We observe negative and significant coefficients of the treatment dummy for the size of the rented-in parcel and newly rented-in parcel after the intervention. The results are generally robust to inference based on wild cluster bootstrap *p*-values. The size of rented-in parcels and newly rented-in parcels after the intervention are smaller by 0.05 and by 0.04 ha for the treated households than for the control households. Given that the average size of rented-in land is 0.33ha and newly accessed land is 0.09 ha, these values correspond to about 15% and 44% of the average. Although we do not have clear evidence, this could be because some landlords did not prefer to rent land to refugees who requested a formal land rental agreement. While the results are not shown here, 38% of refugees who did not formalize the contract reported that the landlord did not agree to sign the contract, suggesting that signing a contract is sometimes viewed unfavorably by the landlords. We found no significant effect of the treatment on household income or psychological distress.

Table 5 presents the LATE estimates of the impact of a formal rental agreement on conflict experiences, land access, income, and psychological distress. Consistent with the ITT estimates, we observe negative and significant effects of a formal land rental agreement of 17.1 percentage points on the experience of contract breach regarding the duration of the agreement but not for other types of conflicts. This suggests that a formal rental agreement reduces certain types of conflict but not all kinds of trouble related to land. We do not find evidence that introducing a formal land rental contract is an effective way to reduce crop damage by animals owned by Ugandans, which is the most frequent problem. Crop damage by animals owned by Ugandans can be caused by landowners as well as other Ugandans who pasture their animals; thus, individual agreements between landlords and tenants are not sufficient to prevent the problem. Our results indicate that making a formal rental agreement significantly reduces the size of the total parcel accessed by 0.23 ha and the size of rented-in parcel by 0.21 ha. We did not observe any significant coefficients of a formal agreement for the income and distress variables.

Table 6 summarizes the ITT estimates on the impact of the treatment on parcel-level variables. Consistent with the household-level analyses, rented-in transactions for the treated households were more likely to be documented. Also, the size of the rented-in parcel was smaller than that of the control refugees, although the coefficient is not

statistically significant. Interestingly, transactions between refugees and owners introduced by friends were less likely to be documented. Our informal interviews revealed that some refugees felt that formalization was not necessary when they trusted their owners, which is consistent with this finding.

4.2 Results for Ugandans

Table 7 compares the mean outcomes of the control and treated Ugandan households at the endline. We observed no significant differences in the probability of formalizing land rental agreements between treated and control Ugandan households. While 17% of treated households signed the contract, 21% of Ugandans in the control group did so. This is likely because the intervention did not provide support to decrease the cost of formalization for the Ugandans in the treatment group. This may suggest that an information campaign alone does not increase the adoption of formal land rental contracts. We did not observe significant differences in conflict experience or size of the rented-out parcels between the control and treatment groups.

Table 8 shows the ITT estimates of the impact of treatment on the formalization of rental agreements, size of rented-out land, and conflict experience with refugees at the household level for Ugandans. We found no significant effect of treatment on any of the

outcome variables. Similar results are obtained when using wild cluster bootstrap *p*-values. Preferences also had no significant impact on the conflict experience or size of the rented-out parcel.

Table 9 summarizes the ITT estimates of the impact of treatment at the parcel level for Ugandans. We found no significant effect of treatment on any of the outcome variables. This finding remains unchanged when using wild cluster bootstrap *p*-values for inference. Altruism has a positive and significant effect on formalizing the transaction, while it has no significant impact on the size of the rented-out land or rent per hectare. This suggests that altruistic Ugandans are more likely to formalize contracts. Trust is positively associated with contract documentation and negatively associated with conflicts and tenants' failure to pay rent, suggesting that Ugandans with high trust are more likely to sign contracts and experience fewer conflicts. The coefficient for the dummy variable of the tenant being a friend in the conflict is negative and significant, suggesting that tenants are less likely to cause problems when they are friends with the owner. These results suggest that trust and altruism play an important role in reducing transaction costs in land transactions between refugees and Ugandans.

5. Theoretical Explanation for the Empirical Results

In this section, we provide a possible theoretical explanation for our empirical results, which show that the treatment reduced the size or rented-in land for refugees. We propose a simple model that illustrates the seasonal land rental relationship between a refugee tenant (R) and a host community landowner (L). At the beginning of the season, R rents a parcel of size $s \geq 0$, generating output $y(s)$, where $\partial y/\partial s > 0$.

We introduce two compliance probabilities based on the regime $m \in \{I, F\}$, denoting the informal and formal regimes, respectively: $\theta_m \in [0,1]$, the probability the landowner complies (tenure security); $\sigma_m \in [0,1]$, the probability the tenant successfully pays the rent r (payment security). Under informal agreements, enforcement is low (θ_I, σ_I) while under formalized agreements, documentation and third-party verification increase both probabilities ($\theta_F > \theta_I,\ \sigma_F > \sigma_I$). However, formalization entails a transaction cost $k > 0$ (e.g., translation, transport, coordination) and a regime-specific cost function $\phi_F(s)$, related to scrutiny or lost flexibility.

After the transaction is realized, L chooses to either comply with or breach the agreement. If L breaches the agreement, they obtain a private benefit $b(s)$ but face sanction F with p_m. With the tenant default risk included, L now compares the benefits of breaching against the expected rent. L breaches if $b(s) > \sigma_m r + p_m$ F. A higher

enforcement probability (p_F) and a higher payment probability (σ_F) both reduce the incentive for the landowner to breach.

Tenant R chooses *s* to maximize expected returns, accounting for the risk of losing the harvest to a breach or failing to meet the rent payment:

$$\theta_m[y(s) - \sigma_m r] - 1[m = F]k.$$

Formalization improves effort by increasing tenure security (θ_m), but it also increases the effective cost of land by making the rent payment more certain (σ_m).

The total surplus $\Pi_m(s)$ represents the net value generated by the relationship. A rental agreement is feasible only if $\Pi_m(s) > 0$.

$$\Pi_m(s) = \theta_m y(s) - \theta_m(1 - \sigma_m)r - 1[m = F]k - \phi_m(s) - u_0 - w_0$$

where u_0 and w_0 represent the reservation utilities of L and R, respectively. Here, $(1 - \sigma_m)r$ represents the payment friction or lost rent that reduces the value of the informal arrangement for the landowner.

Implication 1: Bilateral Commitment

Formalization serves a dual purpose: it reduces the likelihood of contract termination by the landowner (increasing θ_F) and reduces the risk of non-payment by the tenant (increasing σ_F).

Implication 2: The Trade-off

Let s_I^{max} denote the maximum feasible parcel size under the informal regime. If $\Pi_F(s_I^{max}) - \Pi_I(s_I^{max}) = (\theta_F - \theta_I)y(s_I^{max}) - (\theta_F - \theta_I)r - (\theta_F\sigma_F - \theta_I\sigma_I)r - k - \left(\phi_F(s_I^{max}) - \phi_I(s_I^{max})\right) < 0$, e.g., formalization is less attractive for small parcels due to fixed costs and rent payment, the marginal parcel sustainable under informal contracting becomes infeasible under formalization. Consequently, the maximum sustainable parcel size under formalization may be smaller than that under informalization. Even if formalization increases both tenure and payment security, it can reduce the maximum sustainable parcel size $s_F^{max} < s_I^{max}$, leading to a contraction in land access for refugees. This is consistent with the negative coefficient of treatment on parcel sizes presented in Table 6, although the coefficient is not statistically significant.

Implication 3: Ambiguous Income Effects

The net effect on household income is determined by two factors:

$$\Delta Income \approx \underbrace{Secutiry\ Gains}_{+} + \underbrace{Land\ Rental\ Market\ Contraction}_{-}$$

Formalization may reduce certain types of breaches without significantly increasing the overall household income when land transaction is formalized.

6. Conclusion

This study examined the impact of an intervention to formalize land rental agreements on the experience of conflicts between refugees and local Ugandans, land access for refugees, and the income of refugees by conducting an RCT in a unique setting. We find that promoting formal land rental agreements by reducing the transaction costs increased the adoption of formal contracts and decreased the probability of experiencing contract breach over the duration of the agreement by 3 to 4 percentage points. However, the intervention decreased the size of the rented-in parcels accessible to refugees. Our theoretical framework predicts that the formalization of land rental transactions entails fixed costs. As a result, when these costs are relatively high compared to the size of the parcel, landlords may be less willing to incur them for small parcels, potentially leading to smaller rented parcel sizes. Our results highlight the possibility that some refugees may be disadvantaged because of land rental market shrinkage and stress the need to account for the costs accrued when formulating interventions to strengthen tenure security in fragile settings where traditional institutions to mitigate disputes do not exist.

Consistent with Adong et al. (2021), our findings indicate that the level of trust among Ugandans influences land transactions between refugees and host communities.

We show that Ugandan's individual preferences—particularly trust and altruism— are associated with the formalization of land transactions and experience of conflicts, while they did not affect the size of the rented-out parcel. In particular, higher levels of trust and altruism are linked to a greater likelihood of entering into formal rental agreements. At the same time, trust is also related to experiences of land-related conflict, highlighting the role of social capital in reducing transaction costs in the land rental market.

We did not observe a significant impact of formal land rental agreements on household income or psychological distress. This may be because formalizing land rental agreements does not decrease the probability of refugees experiencing crop loss due to animal damage, which has a serious negative effect on their agricultural income. Animal damage is not always attributable to the landowners but may also result from other Ugandans, implying that private contracts between refugees and landlords alone are insufficient to prevent it. Crop damage caused by grazing livestock has been observed not only in the study area but also in other African countries. Our results imply that alternative mechanisms of collective coordination are necessary to enhance contract enforcement for conflicts of interest that cannot be resolved through private agreements between individuals. Further investigation is required to clarify this point.

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Table 1: Conflict Experience, Land Rental Agreement, Income, and Psychological Distress at Baseline and Endline

	2022	2023
(Have) experienced any trouble with Ugandans related to land	0.43	0.47
(Have) experienced crop damage by animals owned by Ugandans	0.33	0.35
(Have) experienced contract breach on duration of the agreement	0.13	0.02
(Have) experienced double renting	0.18	0.03
(Have) experienced conflict over the land rental fee	0.17	0.10
(Have) made formal land rental agreement	0.08	0.46
(Have) performed due diligence	0.07	0.44
=1 if rented any parcel	0.74	0.84
Size of total parcel accessed (ha)	0.41	0.45
Size of rented-in parcel (ha)	0.26	0.30
Size of rented-in parcel which lost access in 2023		0.04
Size of rented-in parcel which gained access in 2023		0.08
Psychological distress measured in the K6	10.72	10.99
Household income net of remittance (USD)	373.00	364.80

Note: Regarding the conflict and formal land rental agreement experience, the baseline (2022) column is based on the question **"Have you ever experienced …?"**, which captures lifetime experience. The endline column (2023) is based on **"Did you … in the last year?"**, which measures incidence over the past 12 months. A total of 285 observations were recorded.

Table 2: Mean Comparison Between Treatment and Control Groups at the Endline

Variable	(1) Treated mean	(2) Control mean	*t*-test Difference (1)-(2)
=1 if formal rental agreement was made	0.542	0.301	0.241***
1 if a household performed due diligence	0.526	0.269	0.257***
Any trouble related to land in 2023	0.448	0.527	-0.079
Crop damage by animals owned by Ugandans in 2023	0.339	0.387	-0.049
Contract breach on duration of the agreement in 2023	0.005	0.043	-0.038**
Double renting in 2023	0.016	0.054	-0.038*
Conflict over the land rental fee in 2023	0.089	0.129	-0.040
Size of total parcel accessed in 2023	0.441	0.478	-0.037
=1 if rented any parcel	0.839	0.839	-0.000
Size of rented-in parcel in 2023	0.281	0.33	-0.049
Size of rented-in parcel which lost access in 2023	0.043	0.026	0.018
Size of rented-in parcel which gained access in 2023	0.068	0.109	-0.041**
Household income net of remittance (USD)	364.839	364.616	0.223
Psychological distress measured in the K6 in 2023	10.984	11	-0.016
	192	93	

Note: ***, **, and * indicate significance at the 1%, 5%, and 10% critical levels, respectively, in the mean comparison test.

Table 3: ITT Estimates on the Impact of Treatment on Formal Rental Agreement and Conflict Experience in 2023 (ANCOVA)

VARIABLES	(1) =1 if formal rental agreement was made	(2) Any trouble related to land	(3) Crop damage by animals of Ugandans	(4) Contract breach on duration of the agreement	(5) Double renting	(6) Conflict over the land rental fee
Treated	0.234**	-0.073	-0.044	-0.040	-0.039	-0.041
	(0.065)	(0.059)	(0.047)	(0.024)	(0.037)	(0.031)
Language ability	0.008	0.115	0.102	0.024	0.042**	-0.108
	(0.097)	(0.068)	(0.089)	(0.018)	(0.014)	(0.076)
Trust in 2022	-0.000	0.003	0.016	-0.001	-0.008**	0.003
	(0.016)	(0.012)	(0.016)	(0.001)	(0.003)	(0.005)
Altruism in 2022	-0.010	0.003	0.013	0.002	0.008*	0.008
	(0.016)	(0.017)	(0.016)	(0.004)	(0.003)	(0.009)
Constant	0.375**	0.406**	0.329	0.009	0.053	0.088
	(0.131)	(0.161)	(0.207)	(0.051)	(0.048)	(0.181)
Observations	285	285	285	285	285	285
R-squared	0.199	0.073	0.077	0.066	0.090	0.043
Wild bootstrap *p*-value	0.0156	0.219	0.312	0.125	0.344	0.172

Note: Clustered standard errors at the village level are in parentheses. Wild bootstrap *p*-values are reported. ***, **, and * indicate significance at the 1%, 5%, and 10% critical levels, respectively. Controls include household size, female-headed household dummy, years of schooling of household head, age of household head, value of livestock (USD), value of household assets (USD), length of stay in the camp (months), and the baseline outcome variables. Village fixed effects are controlled.

Table 4: ITT Estimates on the Impact of Treatment on Land Access, Income, and Psychological Distress (ANCOVA)

VARIABLES	(1) Size of total parcel accessed in 2023	(2) =1 if rented in any parcel	(3) Size of rented-in parcel in 2023	(4) Size of rented-in parcel which lost access in 2023	(5) Size of rented-in parcel which gained access in 2023	(6) Household income net of remittance (USD)	(7) Psychological distress measured in K6 in 2023
Treated	-0.053**	-0.013	-0.050*	0.016	-0.039*	-9.160	0.036
	(0.018)	(0.033)	(0.024)	(0.014)	(0.016)	(18.555)	(0.405)
Language ability	-0.014	-0.071	-0.015	-0.012	-0.037	78.596	-0.081
	(0.039)	(0.054)	(0.033)	(0.019)	(0.023)	(57.765)	(0.445)
Trust in 2022	-0.002	0.008	-0.002	0.001	-0.002	-15.867*	0.001
	(0.005)	(0.008)	(0.006)	(0.002)	(0.004)	(8.146)	(0.107)
Altruism in 2022	0.006	0.007	0.004	-0.001	0.002	-7.043	-0.055
	(0.006)	(0.013)	(0.007)	(0.003)	(0.006)	(12.208)	(0.092)
Constant	0.141**	0.672***	0.185**	-0.000	0.135***	55.556	9.370***
	(0.054)	(0.106)	(0.067)	(0.060)	(0.031)	(183.128)	(1.906)
Observations	285	285	285	285	285	285	285
R-squared	0.825	0.307	0.735	0.084	0.077	0.364	0.087
Wild bootstrap *p*-value	0.031	0.656	0.094	0.250	0.0312	0.625	0.938

Note: Clustered standard errors at village level are in parentheses. Wild bootstrap *p*-values are reported.
***, **, and * indicate significance at the 1%, 5%, and 10% critical levels, respectively. Controls include household size, female-headed household dummy, years of schooling of household head, age of household head, value of livestock (USD), value of household assets (USD), length of stay in the camp (months), and the baseline outcome variables. Village fixed effects are controlled.

Table 5: LATE Estimates on the Impact of Formal Rental Agreement on Conflicts, Land Access, Income, and Psychological Distress

VARIABLES	(1) Any trouble related to land	(2) Crop damage by animals of Ugandans	(3) Contract breach on duration of the agreement	(4) Double renting	(5) Conflict over the land rental fee	(6) Size of total parcel accessed	(7) =1 if rented in any parcel	(8) Size of rented-in parcel	(9) Size of rented-in parcel which lost access	(10) Size of rented-in parcel which gained access	(11) Household income net of remittance (USD)	(12) Psychological distress measured using K6
=1 if formal rental agreement was made	-0.304	-0.186	-0.171*	-0.166	-0.174	-0.225**	-0.059	-0.212*	0.068	-0.165	-38.769	0.152
	(0.281)	(0.266)	(0.096)	(0.118)	(0.177)	(0.110)	(0.178)	(0.111)	(0.052)	(0.102)	(198.475)	(1.770)
Language ability	0.115	0.102	0.024	0.043*	-0.108	-0.012	-0.072	-0.015	-0.012	-0.037	78.779	-0.083
	(0.091)	(0.084)	(0.020)	(0.024)	(0.071)	(0.037)	(0.059)	(0.036)	(0.018)	(0.033)	(56.062)	(0.667)
Trust in 2022	0.003	0.016	-0.000	-0.008	0.003	-0.001	0.008	-0.003	0.001	-0.002	-15.830	0.001
	(0.015)	(0.013)	(0.003)	(0.005)	(0.008)	(0.006)	(0.008)	(0.006)	(0.004)	(0.005)	(12.897)	(0.095)
Altruism in 2022	-0.001	0.011	0.000	0.007	0.006	0.004	0.006	0.002	0.000	0.000	-7.380	-0.054
	(0.023)	(0.020)	(0.006)	(0.006)	(0.013)	(0.008)	(0.014)	(0.008)	(0.005)	(0.007)	(13.614)	(0.139)
Constant	0.518**	0.398*	0.072	0.113	0.152	0.223**	0.685***	0.262***	-0.025	0.196**	69.090	9.321***
	(0.254)	(0.221)	(0.062)	(0.076)	(0.173)	(0.097)	(0.167)	(0.097)	(0.048)	(0.087)	(191.147)	(1.617)
Observations	285	285	285	285	285	285	285	285	285	285	285	285
R-squared	-0.054	0.011	-0.210	-0.146	-0.094	0.727	0.263	0.592	0.027	-0.375	0.363	0.086
Wild bootstrap *p*-value	0.234	0.383	0.008	0.320	0.250	0.078	0.680	0.133	0.281	0.094	0.594	0.945

Note: Robust standard errors are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% critical levels, respectively. Controls include household size, female-headed household dummy, years of schooling of household head, age of household head, value of livestock (USD), value of household asset (USD), length of stay in the camp (months), and baseline outcome variables. Village fixed effects are controlled.

Table 6: ITT Estimates on the Impact of Treatment at the Parcel Level for Refugees

VARIABLES	(1) =1 if the transaction is documented	(2) Parcel size (ha)	(3) log of rent per hectare (USD/ha)	(4) Experienced any trouble	(5) Tenant failed to pay rent as agreed	(6) =1 if owner breach contract on duration or fee
Treated	0.241***	-0.032	-0.042	0.022	-0.048	0.007
	(0.056)	(0.021)	(0.091)	(0.058)	(0.044)	(0.020)
Owner was friend	-0.018	0.027	-0.019	0.096	0.073	0.046
	(0.131)	(0.065)	(0.214)	(0.101)	(0.092)	(0.058)
Owner was introduced by friend	-0.175***	0.003	-0.086	0.021	0.030	0.008
	(0.060)	(0.019)	(0.075)	(0.060)	(0.037)	(0.024)
Trust in 2022	-0.004	0.000	-0.005	0.008	0.004	-0.002
	(0.013)	(0.005)	(0.022)	(0.013)	(0.009)	(0.004)
Altruism in 2022	-0.027	0.005	-0.005	-0.005	0.001	0.005
	(0.020)	(0.008)	(0.027)	(0.020)	(0.015)	(0.007)
Language ability	-0.002	0.036	-0.032	-0.033	-0.100	-0.018
	(0.084)	(0.026)	(0.107)	(0.093)	(0.067)	(0.042)
Constant	-3.043	28.956**	-147.252***	-32.892	-3.279	-15.911
	(32.656)	(12.710)	(47.933)	(33.471)	(25.577)	(12.336)
Observations	347	347	347	347	347	315
R-squared	0.194	0.306	0.170	0.168	0.180	0.094

Note: Clustered standard errors at the household level are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% critical levels, respectively. Controls include household size, female-headed household dummy, years of schooling of household head, age of household head, value of livestock (USD), value of household assets (USD), length of stay in the camp (months), and the baseline outcome variables. Parcel-level characteristics include whether the parcel was newly accessed, starting year of use, distance to the home (km), soil type (loam, sandy, rocky, and clay), soil quality (good, normal, and poor), and slope (steep, moderate, and flat). Village fixed effects are controlled.

Table 7: Descriptive Statistics for Ugandans

Variable	Treated	Control	(1)-(2)
=1 if rented out land to refugees in 2023	0.371	0.310	0.061
Size of the rented-out parcel (ha)	0.364	0.475	-0.110
Change in the size of rented-out parcel (ha)	0.086	0.063	0.023
=1 if the renting-out transaction is documented	0.171	0.207	-0.035
Any trouble with refugees related to land in 2023	0.171	0.103	0.068
Tenant failed to pay the full rent in 2023	0.143	0.069	0.074
Observations	35	29	

Table 8: ITT Estimates on the Impact of Treatment on Formalization, Size of Rented-Out Land, and Conflict Experiences for Ugandans

VARIABLES	(1) =1 if rented out land to refugees in 2023	(2) Size of the rented-out parcel (ha)	(3) Change in the size of rented-out parcel (ha)	(4) =1 if the renting-out transaction is documented	(5) Any trouble with refugees related to land in 2023	(6) Tenant failed to pay the rent in 2023
Treated	0.020	-0.132	-0.069	0.020	0.024	0.044
	(0.193)	(0.229)	(0.249)	(0.174)	(0.130)	(0.104)
Language ability	-0.236	0.106	0.033	-0.163	-0.176	-0.202
	(0.172)	(0.254)	(0.161)	(0.112)	(0.126)	(0.158)
Trust in 2022	-0.021	-0.022	-0.070	0.008	-0.016	-0.005
	(0.029)	(0.032)	(0.049)	(0.020)	(0.021)	(0.010)
Altruism in 2022	-0.021	-0.076	-0.017	-0.013	-0.002	-0.037
	(0.055)	(0.092)	(0.086)	(0.032)	(0.025)	(0.034)
Constant	0.618	1.243	0.830	0.333	0.046	0.246
	(0.345)	(0.710)	(0.804)	(0.311)	(0.220)	(0.323)
Observations	64	64	64	64	64	64
R-squared	0.198	0.284	0.121	0.207	0.145	0.136
Wild bootstrap *p*-value	0.929	0.631	0.847	0.909	0.869	0.693

Note: Clustered standard errors at the LC1 level are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% critical levels, respectively. Controls include household size, female-headed household dummy, years of schooling of the household head, age of the household head, value of livestock (USD), value of household assets (USD), and baseline outcome variables.

Table 9: ITT Estimates on the Impact of Treatment at Parcel Level for Ugandans

VARIABLES	(1) =1 if the renting-out transaction is documented	(2) Size of the rented-out parcel (ha)	(3) Log of rental fee	(4) =1 if experienced any problems while renting out the parcel	(5) =1 if tenant failed the agreed payment
Treated	-0.231	0.000	-0.168	0.026	-0.068
	(0.230)	(0.031)	(0.217)	(0.110)	(0.101)
Tenant is friend	0.064	-0.009	-0.163	-0.203*	-0.195
	(0.196)	(0.165)	(0.216)	(0.106)	(0.106)
Tenant was introduced by friend	-0.038	-0.164	-0.020	0.050	0.058
	(0.175)	(0.106)	(0.258)	(0.292)	(0.293)
Trust in 2022	0.067*	0.015	-0.001	-0.081**	-0.083**
	(0.033)	(0.021)	(0.042)	(0.030)	(0.027)
Altruism in 2022	0.336***	-0.023	-0.167	-0.121	-0.117
	(0.095)	(0.046)	(0.099)	(0.084)	(0.075)
Language ability	0.137	0.259*	0.002	0.537*	0.718**
	(0.216)	(0.130)	(0.161)	(0.252)	(0.242)
Constant	-1.646*	0.290	4.735***	1.168**	1.116**
	(0.706)	(0.328)	(0.598)	(0.467)	(0.368)
Observations	78	78	78	78	78
R-squared	0.398	0.561	0.722	0.655	0.611
Wild bootstrap *p*-value	0.594	0.992	0.633	0.883	0.578

Note: Clustered standard errors at LC1 level are in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% critical levels, respectively. Controls include household size, female-headed household dummy, years of schooling of household head, age of household head, value of livestock (USD), value of household assets (USD), length of stay in the camp (months), and the baseline outcome variables. The parcel characteristics include whether it is newly accessed, starting year of use, distance from home (km), soil type (loam, sandy, rocky, and clay), soil quality (good, normal, and poor), and slope (steep, moderate, and flat). Village fixed effects are controlled.

Appendix 1: Descriptive Statistics for Refugees

VARIABLES	(1) N	(2) mean	(3) s.d.	(4) min	(5) max
Household size	285	7.93	3.97	1	20
Female-headed household	285	0.58	0.49	0	1
Years of schooling of household head	285	4.87	3.94	0	16
Age of household head	285	40.77	13.21	19	83
Length of stay in the camp (months)	285	85.00	45.06	5	342
Value of livestock in January 2022 (USD)	285	88.95	216.00	0	2,458
Value of household asset (USD)	285	5.06	9.92	0	143.4
Language ability	285	0.87	0.34	0	1
Trust in 2022	285	4.94	2.27	0	10
Altruism in 2022	285	4.32	1.54	0.417	8.167
Have experienced any trouble with Ugandans related to land by 2022	285	0.43	0.50	0	1
Have experienced crop damage by animals of Ugandan by 2022	285	0.33	0.47	0	1
Have experienced contract breach on duration of the agreement by 2022	285	0.13	0.34	0	1
Have experienced double renting by 2022	285	0.18	0.38	0	1
Have experienced conflict over the land rental fee	285	0.17	0.38	0	1
Have ever made formal land rental agreement	285	0.08	0.28	0	1
Have ever made due diligence	285	0.07	0.25	0	1
=1 if rented in any parcel in 2022	285	0.74	0.44	0	1
Size of total parcel accessed in 2022 (ha)	285	0.41	0.39	0.0405	3.501
Size of rented-in parcel in 2022 (ha)	285	0.26	0.33	0	3.136
Psychological distress measured in k6 in 2022	285	10.72	4.24	0	21
Household income net of remittance (USD)	285	373.00	505.20	-25.07	2,962
Any trouble related to land in 2023	285	0.47	0.50	0	1
Crop damage by animals of Ugandans in 2023	285	0.35	0.48	0	1

Contract breach on duration of the agreement in 2023	285	0.02	0.13	0	1
Double renting in 2023	285	0.03	0.17	0	1
Conflict over the land rental fee in 2023	285	0.10	0.30	0	1
=1 if formal rental agreement was made	285	0.46	0.50	0	1
1 if a household made due diligence	285	0.44	0.50	0	1
=1 if rented in any parcel	285	0.84	0.37	0	1
Size of total parcel accessed in 2023	285	0.45	0.39	0.0405	3.503
Size of rented-in parcel in 2023	285	0.30	0.32	0	2.43
Size of rented-in parcel which lost access in 2023	285	0.04	0.11	0	1.013
Size of rented-in parcel which gain access in 2023	285	0.08	0.15	0	0.809
Psychological distress measured in K6 in 2023	285	10.99	3.30	1	20
Household income net of remittance (USD)	285	364.80	504.80	0	2,856

Appendix Table 2: Descriptive Statistics for the Ugandans

VARIABLES	(1) N	(2) mean	(3) s.d.	(4) min	(5) max
Household size	64	7.297	3.250	1	15
Female-headed household	64	0.0625	0.244	0	1
Years of schooling of household head	64	6.578	3.250	0	16
Age of household head	64	43.55	13.36	24	83
Language ability	64	0.844	0.366	0	1
Size of owned land in 2022(ha)	64	7.414	7.010	1.012	36.73
Value of livestock in January 2022 (USD)	64	1,099	3,290	0	25,218
Value of household asset (USD)	64	17.64	16.89	1.626	103.0
Have experienced any trouble with refugees related to land by 2022	64	0.156	0.366	0	1
Have experienced crop damage by animals of Ugandans by 2022	64	0.0156	0.125	0	1
Have experienced contract breach on duration of the agreement by 2022	64	0.0312	0.175	0	1
Have experienced double renting by 2022	64	0	0	0	0
Have experienced conflict over the land rental fee by 2022	64	0.109	0.315	0	1
Tenant have failed to pay the rent completely by 2022	64	0.109	0.315	0	1
Size of the rented-out parcels (ha)	64	0.339	0.866	0	5.263
=1 if the renting-out transaction is documented	64	0.0312	0.175	0	1
=1 if due diligence was performed for renting out	64	0.0312	0.175	0	1
=1 if rented out land to refugees in 2022	64	0.328	0.473	0	1
Any trouble with refugees related to land in 2023	64	0.141	0.350	0	1
Tenant failed to pay the rent completely in 2023	64	0.109	0.315	0	1
Size of the rented-out parcel (ha)	64	0.414	0.855	0	4.453
=1 if the renting-out transaction is documented	64	0.188	0.393	0	1
=1 if rented out land to refugees in 2023	64	0.344	0.479	0	1
Change in the size of rented-out parcel (ha)	64	0.0753	0.975	-3.947	4.453

Appendix Table 3: Attrition Probit

VARIABLES	(1) Can we interview this Household?
Treated	0.058*
	(0.026)
Household size	0.006**
	(0.002)
Female-headed household	0.039*
	(0.018)
Years of schooling of household head	0.000
	(0.005)
Age of household head	0.001
	(0.001)
Value of livestock in January 2022 (USD)	0.000
	(0.000)
Value of household asset (USD)	0.000
	(0.001)
Length of stay in the camp (months)	-0.001
	(0.001)
Language ability	-0.068**
	(0.021)
Trust in 2022	0.007
	(0.006)
Altruism in 2022	0.022
	(0.019)
d_village==2	0.028
	(0.015)
d_village==3	0.034**
	(0.013)
d_village==4	0.045**
	(0.017)
d_village==5	0.055***
	(0.012)
d_village==6	0.100***
	(0.018)
d_village==7	-0.016
	(0.029)
Constant	0.722***
	(0.160)
Observations	308
R-squared	0.080

Note: Clustered standard errors at village level in parentheses.
***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Appendix Table 4: Balancing Test of Baseline Household Characteristics and Outcome

Variable	(1) Treated Mean	(2) Control Mean	t-test Difference (1)-(2)
Household size	7.922	7.957	-0.035
Female-headed household	0.589	0.570	0.019
Years of schooling of household head	4.974	4.667	0.307
Age of household head	40.870	40.570	0.300
Value of livestock in January 2022 (USD)	95.141	76.182	18.959
Value of household asset (USD)	5.262	4.642	0.620
Length of stay in the camp (months)	86.849	81.194	5.655
Language ability	0.896	0.817	0.079*
Trust in 2022	4.984	4.860	0.124
Altruism in 2022	4.274	4.407	-0.133
Have ever made formal land rental agreement	0.094	0.065	0.029
Have ever performed due diligence	0.068	0.065	0.003
Have experienced any trouble related to land by 2022	0.401	0.484	-0.083
Have experienced crop damage by animals of Ugandan by 2022	0.312	0.355	-0.042
Have experienced contract breach on duration of the agreement by 2022	0.120	0.161	-0.041
Have experienced double renting by 2022	0.177	0.172	0.005
Have experienced conflict over the land rental fee	0.188	0.129	0.058
Size of total parcel accessed in 2022 (ha)	0.414	0.393	0.020
=1 if rented in any parcel in 2022	0.760	0.710	0.051
Size of rented-in parcel in 2022 (ha)	0.259	0.257	0.002
Household income net of remittance (USD)	377.055	364.608	12.447
Psychological distress measured in K6 in 2022	10.974	10.204	0.770
Number of observations	192		

***, **, and * indicate significance at the 1, 5, and 10 percent critical level.

Appendix Table 5: Balancing Tests for the Ugandans

Variable	(1) Treatment Mean	(2) Control Mean	t-test Difference (1)-(2)
Household size	6.771	7.931	-1.160
Female-headed household	0.086	0.034	0.051
Years of schooling of household head	5.829	7.483	-1.654**
Age of household head	44.257	42.690	1.567
Value of livestock in January 2022 (USD)	1239.232	929.547	309.685
Value of household asset (USD)	17.074	18.326	-1.252
Size of owned land in 2022(ha)	6.654	8.331	-1.677
Language ability	0.800	0.897	-0.097
Have experienced any trouble with refugees related to land by 2022	0.200	0.103	0.097
Tenant have failed to pay the rent completely by 2022	0.171	0.034	0.137*
=1 if rented out land to refugees in 2022	0.257	0.414	-0.157
Size of the rented-out parcels (ha)	0.279	0.412	-0.133
=1 if the renting-out transaction is documented	0.000	0.069	-0.069
=1 if due diligence was performed for renting out	0.000	0.069	-0.069
Number of observations	35	29	

Note: ***, **, and * indicate significance at the 1, 5, and 10 percent critical level in the mean comparison test.

Appendix A1

Questions related to preferences

Q17.1 We now ask you for your willingness to act in a certain way. Please again indicate your answer on a scale from 0 to 10. A 0 means "completely unwilling to do so," and a 10 means "very willing to do so." You can also use any number between 0 and 10 to indicate where you fall on the scale, using 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10.

17.1.1	How willing are you to give up something that is beneficial for you today in order to benefit more from that in the future?	
17.1.2	How willing are you to punish someone who treats **you** unfairly, even if there may be costs for you?	
17.1.3	How willing are you to punish someone who treats **others** unfairly, even if there may be costs for you?	
17.1.4	How willing are you to give to good causes without expecting anything in return?	
17.1.5	When someone does me a favor, I am willing to return it.	
17.1.6	If I am treated very unjustly, I will take revenge at the first occasion, even if there is a cost to do so.	
17.1.7	I assume that people have only the best intentions.	

Q17.2 Please tell me, in general, how willing or unwilling you are to take risks, using a scale from 0 to 10, where 0 means you are "completely unwilling to take risks" and 10 means you are "very willing to take risks." You can also use any number between 0 and 10 to indicate where you fall on the scale, using 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, or 10.

Q17.3 Please think about what you would do in the following situation. You are in an area you are not familiar with, and you realize that you lost your way. You ask a stranger for directions. The stranger offers to take you to your destination.
Helping you costs the stranger about 1200 UGX in total. However, the stranger says he or she does not want any money from you. You have six presents with you. The cheapest present costs 300 UGX, the most expensive one costs 1800 UGX. Do you give one of the presents to the stranger as a "thank you" gift?
(If yes, ask:) Which present do you give to the stranger?

1. No, would not give present
2. The present worth 300 UGX
3. The present worth 600 UGX
4. The present worth 900 UGX
5. The present worth 1200 UGX
6. The present worth 1500 UGX
7. The present worth 1800 UGX
8. (DK/NA)
9. (Refused)

Q17.4 Imagine the following situation: Today you unexpectedly received 60000 UGX. How this amount would you donate to a good cause? (Values between 0 and 60000 are allowed)

_____ UGX

Q17.5 Do you think most people would try to take advantage of you if they got a chance, or would they try to be fair?

1. Would take advantage of you
2. Would try to be fair

Q17.6 Would you say that most of the time people try to be helpful, or that they are mostly just looking out for themselves?

1. Try to be helpful
2. Just look out for themselves

Q17.7. Generally speaking, would you say that most people can be trusted or that you can't be too careful in dealing with people?

1. Most people can be trusted
2. Can't be too careful

Questions related to psychological distress

The following questions ask about how you have been feeling during the past 30 days. For each question, please check one that best describes how often you have had this feeling.

	1=All of the time	2=Most of the time	3=Some of the time	4=A little of the time	5=None of the time
Nervous?					
Hopeless?					
Restless or fidgety?					
So depressed that nothing could cheer you up?					
That everything was an effort?					
Worthless?					

Appendix A2 **Protocol for the Intervention**

1. Visiting refugee block leaders and LC1 chairpersons

- Explanation of the purpose of the study
- Request for cooperation in the study
- Request for a list of residents
- Request for a list of potential landlords who can rent out land (with more than 5 acres of cultivable land) from the LC1 chairperson
- Request that formal land rental agreements be signed when applicable

2. Invitation to meetings

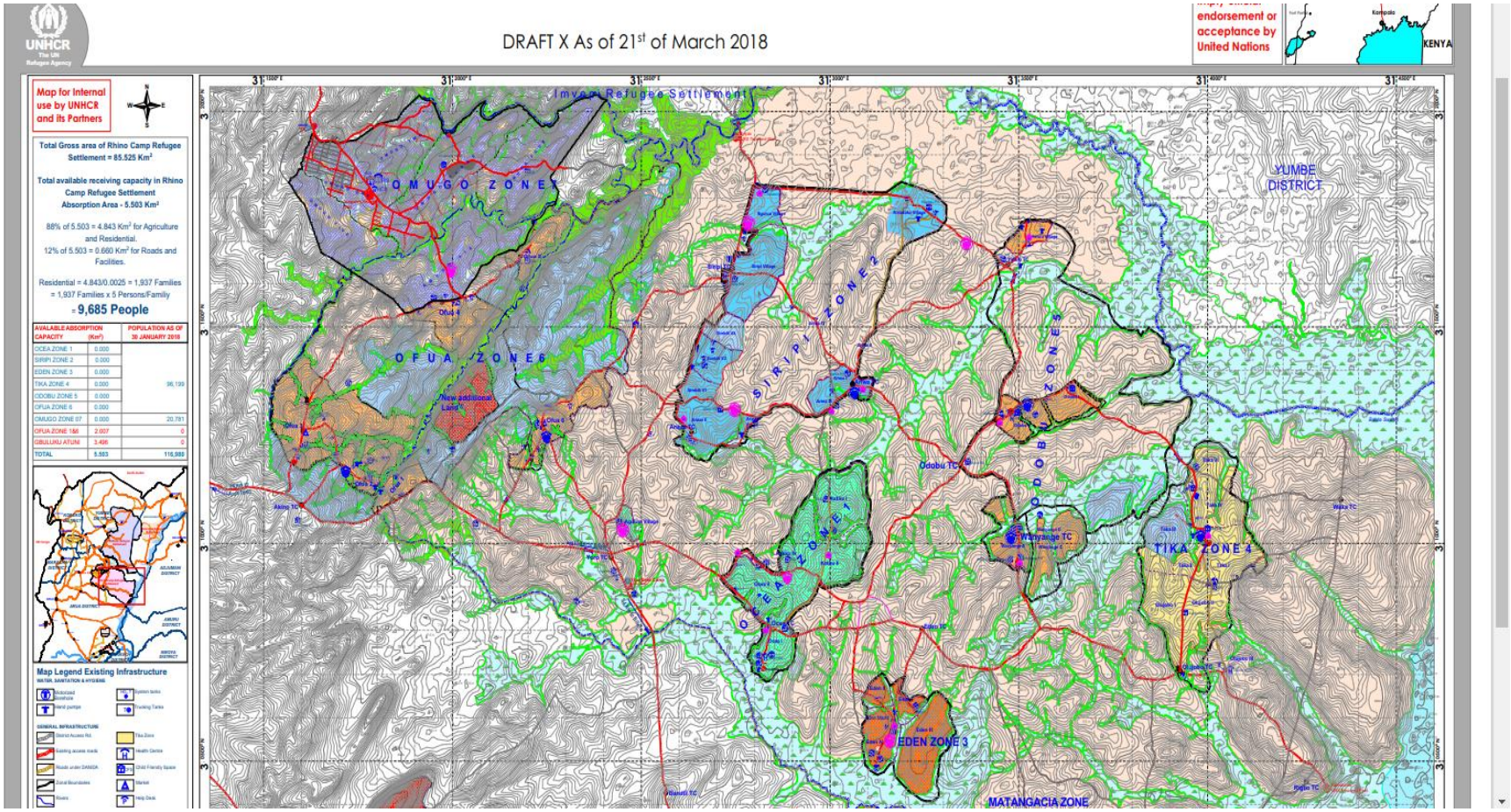
- We invite selected refugees and Ugandans to meetings with the assistance of refugee leaders and the LC1 chairperson.
- We explain the purpose of the meeting and obtain consent to participate (during the baseline survey).

3. Meeting (approximately 30–60 minutes)

- Self-introduction
- Explanation of the study
    - Names and affiliations of the principal investigator and co-investigators
    - Purpose of the study
    - Activities (baseline survey, intervention, and endline survey)
    - The information will be used solely for academic purposes, and personal information will not be disclosed under any circumstances
    - Contact information for local consultants in both Kampala and the camp
- Explanation of formal land rental agreements
    - Examples of common conflicts (e.g., double renting, contract duration, rental fee payment, animal damage)
    - How formal agreements can help prevent such conflicts
    - Information required in the agreement (e.g., contract duration, rental fee, names of parties)
    - The agreement should be witnessed by refugee leaders and the LC1 chairperson
    - The agreement template is available at the OPM office, as well as from refugee block leaders and the LC1 chairperson
    - Participants may conduct due diligence if they wish
    - During due diligence, the LC1 chairperson and a third party physically visit the parcel to verify its size and ownership
    - Due diligence services are available through NRC upon request, either by visiting their office or contacting them through partner NGOs (contact details are provided)

- As part of due diligence, we provide local language translation, document copying, and transportation if necessary
- We assist in arranging meetings between refugees and landlords

Appendix Figure A1: Map of Rhino Refugee Camp



Source: UNHCR