



PALM ASSOCIATES

FOLLOW-ON IMPACT EVALUATION OF THE TENURE AND GLOBAL CLIMATE CHANGE PROJECT IN ZAMBIA

FINAL REPORT

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ABSTRACT

Under the Communications, Evidence and Learning Project, NORC conducted a follow-on impact evaluation (IE) of the Tenure and Global Climate Change Activity (TGCC) in Zambia, which implemented customary land formalization and agroforestry activities across four chiefdoms in Zambia's Eastern Province during 2014-2017, followed by additional support during 2018-2019. The purpose of the follow-on IE is to provide evidence of the longer-term impacts of TGCC's activities on tenure security; land governance; agroforestry uptake and other climate-smart agricultural investments; agricultural productivity; livelihoods; food security; and women's empowerment. The follow-on IE particularly obtains learning on whether strengthening smallholders' tenure security via the TGCC land tenure activities incentivizes farmers to adopt agroforestry on their farms. As one of few RCTs conducted to date in the land sector, the IE contributes to a growing body of rigorous evidence on the effects of customary land certification, for whom, and reasons why.

The follow-on IE was conducted seven years after the start of TGCC and two to five years after household receipt of agroforestry support, participatory land mapping, Customary Land Certificates (CLCs) and related land governance interventions. The IE adopts a four-arm cluster-randomized controlled trial approach to assess the average impacts of the interventions. Differential impacts are also assessed for female-headed, youth-headed, elder-headed, poorest and land constrained households. The analysis draws on 3 rounds (2014, 2017, 2021) of household survey data from a panel of 2,076 households across 246 villages, and qualitative data collection to explore reasons for impacts and the pathways by which they were achieved.

The results establish longer-term impacts of the TGCC interventions, help to refine the anticipated theory of change and provide insights into how donor-supported programming can continue to strengthen and build sustainability over the longer term. At follow-on, substantial positive impacts on households' tenure security were sustained and new impacts were observed for improved land governance within communities, agroforestry uptake, and (to a lesser extent) improved agricultural production as a result of agroforestry. There was also strong evidence of a clear link between TGCC's land tenure interventions, beneficiaries' stronger tenure security and confidence in land governance, and farmers' increased adoption of agroforestry. This has positive implications for farmers' soil fertility and agricultural productivity and contributes to broader climate change mitigation and adaptation objectives.

However, there was little evidence of impacts on household livelihoods or women's empowerment, although the program improved women's possession of documented land rights and familiarity with CLCs. Results suggest a strong need to revisit the intended theory of change for these elements and incorporate more explicit and targeted strategies to achieve substantive gains on women's land rights, tenure security and empowerment as part of core programming. Additional recommendations related to providing sustained support for land administration and governance, and follow-up technical services to help maintain agroforestry gains over time.

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ACRONYMS

CDLA	Chipata District Land Alliance
CEL	Communications, Evidence and Learning
CLC	Customary Land Certificate
CSA	Climate-Smart Agriculture
COMACO	Community Markets for Conservation
CSO	Civil Society Organization
DDI	Bureau for Development, Democracy and Innovation (USAID)
EEI	Center for Energy, Environment and Infrastructure (USAID)
FGD	Focus Group Discussion
IE	Impact Evaluation
ILRG	Integrated Land and Resource Governance
IRB	Institutional Review Board
ITT	Intent-to-treat
KII	Key Informant Interview
LEVERAGE	Land Evidence for Economic Rights and Gender Empowerment
MDE	Minimum Detectable Effect
MFI	Micro-Finance Institution
NGO	Non-Governmental Organization
RCT	Randomized Controlled Trial
STARR II	Strengthening Tenure and Resource Rights II
TGCC	Tenure and Global Climate Change
TOC	Theory of Change
TOT	Treatment-on-the-Treated
TWFE	Two-Way Fixed Effects
USAID	United States Agency for International Development
VLC	Village Land Committee

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EXECUTIVE SUMMARY

EVALUATION PURPOSE

This report presents the results of a mixed-methods randomized-controlled trial (RCT) impact evaluation (IE) of the Tenure and Global Climate Change (TGCC) activity in Zambia. The purpose of this follow-on IE is to provide USAID with evidence of the longer-term impacts of TGCC's customary land formalization and agroforestry components on six different families of outcomes: tenure security; land governance; agroforestry uptake and other climate-smart agricultural investments; agricultural productivity; livelihoods; and food security and women's empowerment. The IE was conducted by NORC at the University of Chicago under the Communications, Evidence and Learning (CEL) project.

The impact analysis for this IE draws on 3 rounds of household panel survey data collected from 2,313 households across 246 villages, in 2014 (baseline), 2017 (endline) and 2021 (follow-on). Overall conclusions integrate the results from the statistical estimates of impact with additional exploratory analyses, descriptive summary statistics and qualitative data collected across 32 villages at follow-on.

The evaluation findings:

- Establish longer-term impacts of the TGCC activity nearly seven years after program start;
- Deepen the knowledge base on efforts to strengthen women's rights and access to land, and
- Contribute to informing USAID strategy and programming in land and related sectors.

As one of few RCTs conducted to date in the land sector, the TGCC follow-on IE also contributes to a growing body of evidence on the effects of customary land certification, for whom, and reasons why, across a range of country and customary land contexts in sub-Saharan Africa.

TGCC ACTIVITY AND EVALUATION BACKGROUND

TGCC was a five-year (2013-2018) program that operated in several countries. In Zambia, TGCC explored the relationship between secure resource tenure and the adoption of agroforestry practices, among other activities. Conducted during 2014-2017, the activity piloted participatory land mapping and certification of customary land rights for households, village land governance and administration, and provisioning of agroforestry extension services. The activity ultimately worked in 541 villages and provided customary land certificates for 17,871 parcels across five chiefdoms in Chipata District in Zambia's Eastern Province. TGCC's work in four of those chiefdoms (Maguya, Mkanda, Mnukwa and Mshawa) is the focus for this follow-on impact evaluation.

The TGCC activity consisted of two main components: (1) A Land Tenure intervention that raised awareness on customary land rights and governance, established Village Land Committees in villages, conducted participatory mapping of household customary land parcels, and issued Customary Land Certificates (CLCs) to households; and (2) An Agroforestry intervention that provided agroforestry extension services, established farmer groups and utilized a lead farmer approach to promote planting of agroforestry species on fields, with a focus on *Faidherbia albida* (Musangu) and *Gliricidia sepium* (Gliricidia).

USAID independently commissioned a RCT impact evaluation of TGCC at the time of activity design, to obtain rigorous evidence-based learning on the impacts of the customary land certification process and the potential role of tenure security in increasing farmer uptake of agroforestry and other CSA

practices. As part of the RCT design for the activity, villages across the four chiefdoms in Chipata District were randomized to receive one of four combinations of the TGCC intervention: the Land Tenure component only, the Agroforestry component only, the join Land Tenure + Agroforestry components, or no TGCC programming (control group). After the TGCC activity end, USAID supported the expansion of the TGCC Land Tenure component in 2018-2019 to villages that had received only the Agroforestry component or no programming at all, in three of the four chiefdoms. This post-TGCC Land Tenure programming was implemented by the same local implementing partner, Chipata District Land Alliance, and was supported through USAID's Integrated Land and Resource Governance (ILRG) task order under the Strengthening Tenure and Resource Rights II (STARR II) Indefinite Delivery / Indefinite Quantity contract.

EVALUATION QUESTIONS, DESIGN, METHODS AND LIMITATIONS

DESIGN

The follow-on IE uses a rigorous RCT approach to assess the longer-term impacts of TGCC's Land Tenure and Agroforestry interventions and is intended to build on evidence obtained from the 2017 endline IE of TGCC. The follow-on IE estimates longer-term impacts of the TGCC (2014-2017) and post-TGCC customary land documentation programming conducted during 2018-2019, some seven years after the start of the TGCC activity and two to five years after household receipt of participatory land mapping and CLCs.

The IE of the TGCC activity was designed as a four-arm cluster-randomized RCT, and was implemented to test the individual effects of the Land Tenure and Agroforestry components of the TGCC activity and explore their interactions. Baseline data was collected in 2014, prior to the start of the TGCC program, and endline data was collected in 2017 following the completion of TGCC activities. The follow-on data was collected in 2021, after a 1-year postponement due to the COVID-19 pandemic.

An endline IE of TGCC conducted in 2017 found evidence for impacts on household tenure security, and some change on agroforestry uptake, although the rate of tree planting and seedling survival were low. There was no evidence at 2017 endline of impacts on land governance, agricultural productivity, or livelihoods, nor that tenure security led to a higher rate of agroforestry uptake. By sub-groups, some positive impacts were found for female-headed households and elder-headed households.

QUESTIONS

The 2021 follow-on IE revisits the core learning interests for the IE per its design, and expands the focus on household food security, women's land issues and empowerment, linkages between CLCs and agroforestry uptake, and household interest in and knowledge about how to update CLCs. In addition to the household, village leader, village land committee and yield group leader core surveys for this IE, the follow-on IE also newly implemented a wives' survey module as part of the household survey instrument, administered to the female primary spouse in the household, and a gender-based violence module administered to all female survey respondents. Table I summarizes the evaluation outcome families, hypotheses and indicators.

Table 1: Follow-on IE Outcome Families, Hypotheses and Indicators

Outcome Family	Hypotheses: Households in villages receiving the TGCC intervention have...	Indicators
1. Tenure Security	H1: ...different levels of village- wide incidence of land conflicts. H2: ...perceive different levels of tenure security.	- Indices of HH perception of: - Overall tenure security - Long-term tenure security - Short-term tenure security - Perceived expropriation risk from internal actors - Perceived expropriation risk from external actors - HH experienced a land dispute with 3 years of survey - HH perceived risk of land loss from each of 6 potential sources
2. Land Governance	H3: ...perceive different levels of transparency regarding the land allocation process and accountability of land allocation decision makers. H4: ...different levels of satisfaction regarding the resolution of land disputes.	- HH believes: - Leaders are trustworthy on land decisions - Leaders are accountable - Land decisions are fair - Land decisions are transparent - Land rules are clear - Leaders protect natural resources - HH participates in land related meetings - HH feels women, elderly, poor, minority tribe members, vulnerable groups are disadvantaged in land decisions (separate indicator for each)
3. Uptake of Agroforestry	H5: ...greater uptake of agroforestry.	Household engaged in agroforestry on at least one field
CSA Field Investment	H7: ...greater uptake of climate-smart agriculture (excluding agroforestry). H8: ...greater uptake of CSA field investments.	- HH practiced: - Zero tillage - Ridging - Planting basins - Composting - Crop rotation - HH left a field fallow - Length of fallow period - HH used synthetic fertilizer
4. Agricultural Productivity	H9: ...higher agricultural productivity and crop yields.	- Household reported experiencing improved crop growth as a result of agroforestry - Household reported experiencing improved crop yields as a result of agroforestry
5. Livelihoods	H10: ...different livelihood and welfare outcomes.	- Household rented out land - Household obtained a loan from a formal credit source

Outcome Family	Hypotheses: <i>Households in villages receiving the TGCC intervention have...</i>	Indicators
6. Food Security and Women's Empowerment**	HI1: ...increased food security. HI2: Female primary decisionmakers in households in villages receiving the TGCC intervention have higher perceived tenure security and control over land. HI3: Wives in households in villages receiving the TGCC intervention have different risk of intimate partner violence (IPV)	- Household Hunger Scale score - Number of months HH experienced hunger - Female primary decisionmaker in HH: - Perceived tenure security - Experienced a land dispute in last 3 years - Is familiar with CLCs - Has a CLC - Believes land laws protect women's land rights - Is confident she will inherit land - Has own agricultural land - Contributes to HH agricultural decisions - Number of assets female primary decisionmaker in HH owns jointly - Wife in HH reports experiencing any form of controlling behaviors, emotional, physical or sexual violence

** New outcome family added for the 2021 follow-on IE.

METHODS

The follow-on IE uses a household panel dataset to assess the longer-term impacts of the TGCC interventions, individually and jointly, on household-level outcomes across six outcome families. The primary analysis focuses on intent-to-treat (ITT) estimates of program impacts, which measures the impacts to households of being offered the different village-wide TGCC components that were randomly allocated to villages. Given identification challenges due to the sample constraints, a series of supplemental exploratory regression analyses are also conducted to gain additional insights into the below issues and help build overall confidence in patterns of key findings:

- Patterns of impacts for the subset of Land Tenure households that received a CLC, via a treatment effect on the treated (TOT) approach;
- Potential differences in average impacts for households in the TGCC Land Tenure intervention cohort and the post-TGCC cohort ("early" and "late" cohorts);
- Potential differences in magnitudes or direction of treatment effects across the baseline to endline (2014-2017) and endline to follow-on (2018-2021) time periods, via an interacted two-way fixed effects (TWFE) approach; and
- Heterogeneous treatment effects based on population sub-group at baseline.

The heterogeneity analyses explore how impacts may have varied for five population sub-groups of interest: female-headed households, youth-headed households, elderly-headed households, poorest-households and land-constrained households.

STRENGTHS AND LIMITATIONS

The RCT design, relatively large household and village sample sizes, and availability of 3 rounds of panel data constitute significant strengths for measuring TGCC's impacts over the longer term, which

enhances the robustness and validity of findings. In addition, the mixed-methods qualitative and quantitative approach at follow-on enables triangulation of findings across multiple sources and allows for more substantive interpretation of the statistical impact results, identification of potential causal mechanisms by which observed impacts were achieved, and an understanding of how context factors may have influenced outcomes. Finally, the collection of the follow-on data several years after the conclusion of TGCC's agroforestry and customary land formalization activities provides an unusual opportunity to gain insights into the longer-term impacts and sustainability of such programming for household beneficiaries.

The follow-on IE has two key limitations:

- Households from Land Tenure villages in two of the four chiefdoms received participatory land mapping and related services but did not ultimately receive the CLC document as intended, due to chief withdrawal of support for document signing and distribution back to households. This “partial” treatment for a substantial proportion of villages is correlated with chiefdom and was present for both the 2017 endline and 2021 follow-on. The IE team mitigates this to some extent by relying on ITT estimates, which provide average impacts across both groups of households. Such results are also considered more policy relevant because they more accurately reflect actual implementation experiences. Supplemental analyses are also conducted to gain insights into differences in impacts for households that received the CLC and those who did not.
- The implementation of the post-TGCC Land Tenure programming in 2018-2019 introduces a phased roll-out for the Land Tenure component, but its implementation in only 3 of the 4 chiefdoms poses some challenges for the impact analysis because it results in imbalance across treatment arms and a smaller than desirable sample size for two of the four arms. The follow-on team conducted supplemental analyses to gain additional insights into patterns of results and build confidence in the robustness of reported impacts. The statistical results are also triangulated with qualitative findings to determine extent of corroboration and whether there is support for viable mechanisms by which impacts could have been achieved.

FINDINGS AND CONCLUSIONS

LAND TENURE: Strong evidence that the TGCC and post-TGCC Land Tenure activities led to sustained positive impacts on household tenure security over the longer term, stemming from both the participating land mapping activities and CLC receipt. Qualitative findings indicate that CLCs have played an important role in mitigating land disputes between villages and among owners of neighboring parcels. Group discussion participants and household survey respondents strongly felt the CLC could protect them from losing their land against their will. However, many households are not sure if it is possible to update their CLC, or how to do it. Among household survey respondents, less than half of respondents who had received a CLC said they had enough information about how to make updates to their CLCs.

LAND GOVERNANCE: There is strong evidence for significant and positive impacts on household perceptions of land governance in their village as a result of the TGCC intervention, for households in villages that received either the Land Tenure or the joint Land Tenure + Agroforestry interventions. the TGCC land tenure interventions reduced household's perceived likelihood of encroachment or unauthorized expropriation by elites, neighboring villages, chiefs, headman, and family members by 7-11 percentage points on average in the Land tenure treatment group and 6-9 percentage points on average in the Agroforestry + Land Tenure treatment group. Households that received the Land Tenure

component are more likely to see their village leader decisions about land issues as fair and transparent, leaders as trustworthy, and perceive land-related rules in the village to be clear. Qualitative findings indicate that TGCC's participatory approach to land mapping, documentation and related services played a role in improved land governance in villages, as did the establishment of Village Land Committees (VLCs). In villages where VLCs are still active, these committees continue to play an important role acting as witnesses for land disputes, consulting parcel demarcation maps for the village that were created by the intervention, and mediating land disputes. Land governance impacts appear to have accrued after the conclusion of TGCC.

AGROFORESTRY UPTAKE AND OTHER CLIMATE-SMART AGRICULTURAL PRACTICES: There is a large and positive impact on agroforestry uptake among households in villages that received the TGCC joint Land Tenure + Agroforestry interventions. Regression analysis of impacts suggest that TGCC led to a 15 percentage point increase, on average, in the likelihood a household engaged in agroforestry as a result of the combined TGCC intervention. The impact analysis does not find evidence for a positive impact on agroforestry uptake among households in villages that only received the Land Tenure intervention, or only received the Agroforestry intervention. There is little evidence for impacts of TGCC on household use the other CSA practices that were assessed, including zero tillage, planting basins, composting on fields, or practicing crop rotation. Most of these practices were already common at baseline. Supplemental analyses suggest sustained uptake of agroforestry during the follow-on period.

Qualitative evidence from over 40 FGDs strongly suggested that many respondents feel having a CLC makes them more likely to plant agroforestry trees. Respondents directly tied land mapping and receipt of CLCs to their increased interest in undertaking agroforestry. Others highlighted that as a result of the participatory mapping and CLC, they had more confidence in where their field boundaries are, allowing them to farm all the way to the edge of the field without worrying about conflicts with neighbors. In doing so, they effectively increased the area of their fields under cultivation. With respect to agroforestry species, *Gliricidia* was more commonly planted than *Musangu*, and many respondents had a better experience with *Gliricidia*. Benefits from agroforestry have typically not been sufficient to significantly reduce farmer's reliance on synthetic fertilizers.

AGRICULTURAL PRODUCTIVITY: The follow-on regression analysis does not find evidence for an impact of the TGCC interventions on either respondent self-reported changes to crop yields or improved crop growth, as a result of engaging in agroforestry. This is consistent with the 2017 endline. However, these regression analyses are particularly underpowered due to the small number of households at baseline that practiced agroforestry. Supplemental regression analysis do provide some evidence that farmers believed their agroforestry practices had resulted in higher crop yields. This is supported by qualitative findings. On the whole, the results from follow-on suggest that by 2021, farmers who engaged in agroforestry appear to be starting to realize a range of benefits. This represents an improvement over impacts measured at 2017 endline, and suggests that productivity benefits to farmers who engaged in agroforestry as a result of TGCC are beginning to materialize over the longer term.

LIVELIHOODS: The impact analyses does not find evidence for an impact of the TGCC interventions on obtaining a loan from a formal credit source or renting out land. Obtaining a loan from a formal credit source is exceedingly uncommon among households in the TGCC implementation zone. Respondents are also concerned that using the CLC and their land as collateral for such loans could be disastrous for them in the event of defaults. The incidence of renting out land appears to have increased since baseline,

where it was very uncommon, but not all respondents saw this as a positive change since it has altered traditional norms around land sharing and borrowing.

FOOD SECURITY AND WOMEN'S EMPOWERMENT: At follow-on, 10.5 percent of households surveyed suffered from moderate to severe hunger, based on the Household Hunger Scale. There were no significant differences in the degree of hunger experienced based on TGCC treatment status. However, hunger was unevenly distributed among chiefdoms, and more pronounced in Mkanda and Mshawa. Supplemental TOT analysis suggests that households that received the joint Land Tenure + Agroforestry intervention and received a CLC have a reduction in the HHS score and saw a half-month reduction in the number of hunger months they experienced. These results could be driven by chiefdom imbalances on hunger, however, and require some additional exploration.

The ITT impact analysis finds little evidence for impacts on women's empowerment, however the TOT analysis, conducted on women respondents from CLC-holding households that received the Land Tenure component, suggests a 27 percent increase in the likelihood the female primary decision maker in a household personally has a CLC; a 59 percent increase in the likelihood she is familiar with CLCs in Zambia; and a 1.2 unit increase in the number of assets reported jointly owned by husband and wife. However, descriptive statistics and qualitative findings highlight several significant gender gaps related to access, ownership and control of land, size of land holdings and types of disputes that women commonly face. Men were reported as the primary decision maker for 69 percent of fields at follow-on, while women were reported as the primary decision maker for 29 percent of fields.

With respect to Intimate Partner Violence, the impact analyses at follow-on do not find evidence for a change in wives' risk of experiencing IPV as a result of the TGCC interventions, and relative to the control group probability of 44.2 percent. The findings are similar for the ITT and TOT analyses and suggest that TGCC programming was not associated with a change in wives' experience of IPV. Overall, 40.6 percent (N=269) of wives surveyed at follow-on reported experiencing any form of IPV, which is slightly lower but similar to Zambian national statistics on the same. The most common forms were controlling behaviors, while reported physical or sexual violence was substantially less common.

RECOMMENDATIONS

Based on the findings and conclusions, the evaluation team proposes the following recommendations:

- *Future programs should explicitly focus on designing and implementing new companion strategies that aim to achieve more substantive gains on for women as part of their core land tenure programming.*
- *Future programs should plan to sequence some form of local institutional land governance support beyond the initial 3-5 year program cycle, to help ensure that land governance gains are sustained over time.*
- *Consider ways to sequence support for the customary land administration system into the future, so that the system TGCC helped to develop and capacity within CDLA and related local institutions remains functional over time, and households that received CLCs can access related land administration services.*
- *To help sustain agroforestry uptake, consider building in periodic follow-up technical extension services on some interval after the conclusion of the initial support.*

INTRODUCTION

This report presents results of a follow-on impact evaluation (IE) of the Tenure and Global Climate Change (TGCC) activity in Zambia. The follow-on IE was commissioned by (USAID/DDI/EEI) and conducted by NORC at the University of Chicago under the Communications, Evidence and Learning (CEL) project, as part of the Land Evidence for Economic Rights and Gender Empowerment (LEVERAGE) activity. The evaluation was conducted in four chiefdoms in Zambia's Chipata District, in Eastern Province, where USAID has supported customary land formalization and strengthening of women's land rights since 2014, through its Tenure and Global Climate Change (TGCC) and Integrated Land and Resource Governance (ILRG) activities.

The follow-on IE uses a rigorous randomized controlled trial (RCT) approach to assess the longer-term impacts of TGCC's Land Tenure and Agroforestry interventions on indicators of household tenure security, land governance, agroforestry uptake and other climate-smart agricultural (CSA) investments, agricultural productivity, livelihoods, food security and women's empowerment. The impact analysis for this IE draws on 3 rounds of household panel survey data collected from 2,313 households across 246 villages, in 2014 (baseline), 2017 (endline) and 2021 (follow-on). Overall conclusions integrate the results from the statistical estimates of impact with additional exploratory analyses, descriptive summary statistics and qualitative data collected across 32 villages at follow-on. The report adopts a similar focus and approach as the initial IE design and a 2017 endline IE conducted shortly after the conclusion of TGCC programming in the four chiefdoms. This report:

- Summarizes findings for the follow-on data collection conducted in 2021;
- Provides statistical analyses and estimates of TGCC's longer-term impacts nearly seven years since program inception in 2014, on outcome and impact variables across six outcome families, per IE design and additions made for the 2021 follow-on round;
- Compares the follow-on findings to results from the 2017 IE endline;
- Integrates findings from qualitative data collection at follow-on to provide additional interpretation of results and discussion on potential mechanisms for impacts; and
- Presents overall conclusions and recommendations related to the evaluation questions and overarching development hypotheses.

CUSTOMARY LAND CONTEXT IN ZAMBIA

Zambia has a dual land tenure system, in which state land is administered by the Ministry of Lands via a leasehold system while customary land and resource governance is administered via a legally recognized traditional customary systems under the authority of the country's 288 traditional chiefs who historically had little interaction with central government over land issues, including the Ministry of Lands. The overwhelming majority of Zambia's 75 million hectares of land¹ is administered under a customary system managed by chiefs and other traditional authorities, including advisors to chiefs (*indunas*) and village headpersons. Chiefs historically administered their land holdings primarily via oral records and the absence of officially delineated chiefdom,² village and individual parcel boundaries within villages has

¹ At the time of Zambia's independence in 1964, 94% of land in the country was estimated to be under customary tenure. The current percentages of land under state and customary tenures is unknown. Government of Zambia aims to establish clarity on this via a National Land Audit Programme that began in 2014, but has not been completed to date. For additional general background, see: <https://gtn.net/country-work/zambia/> and <https://pmrczambia.com/wp-content/uploads/2021/11/Analysis-of-the-National-Lands-Policy-Infographic.pdf>

² Chiefdom boundaries were established in 1958 but have not been updated since that time.

led to or exacerbated conflicts at each of these levels regarding land ownership, allocation and use rights, and contributed to concerns over non-transparent land governance and land-based corruption.

Under customary norms, individuals and families obtain use rights to land typically via allocation from a village headperson or chief, inheritance, or through their own clearing of unused land. Households under this customary system typically have no documentation of their customary land rights and face uncertainties over land access, inheritance, and allocation processes that contribute to ongoing land conflicts. Moreover, insufficient access to arable land is a recognized driver of continued impoverishment in rural areas of the country, where farmers struggle with low yields, unreliable access to fertilizers and low resilience capacity. Women are particularly vulnerable to unauthorized appropriation of their land.

Systematic land documentation processes for households and villages within customary chiefdoms are new in the Zambian context but have been a subject of interest among several different stakeholders. In recent years, some customary authorities in Zambia have gained an interest in documenting their land resources through individual parcel mapping and village mapping, and the issuance of Customary Land Certificates (CLCs) to land users within their chiefdoms. Systematic mapping and documentation of customary lands within chiefdoms may also contribute to Government of Zambia land reform goals, as the Ministry of Lands seeks to audit the status of the country's landholdings.

The status of customary land has also gained additional prominence with Zambia's adoption of a new National Lands Policy in May 2021, after two decades of effort. The Policy aims to improve land management and administration in the country via several strategic objectives. These include strengthening land allocation mechanisms and improving access and security of tenure over land, land ownership and functioning land markets, among others.³ More broadly, land reforms in the country also reflect a growing interest in how to more systematically recognize and administer individual, household, or communal customary land rights, and the potential benefits obtained from this. However, although a National Land Title Program in Zambia currently aims to document and administer Certificates of Title to owners of state land, currently there is no corresponding national program in place to issue land documentation to users of customary land in the country. The TGCC activities to pilot this process in several chiefdoms in the country, together with evidence-based learning through IEs and other study efforts, are therefore well-situated to provide important learning on these processes and potential benefits to customary land users in the country.

As one of few RCTs conducted to date in the land sector,⁴ the TGCC follow-on IE also contributes to a growing body of evidence on the effects of customary land certification, for whom, and reasons why, across a range of country and customary land contexts in sub-Saharan Africa. Learning from these studies helps to fill important knowledge gaps on theories of change within the sector, including helping to refine potential causal pathways, deepening the understanding of which mechanisms appear to work to achieve impacts within particular contexts and why, and gaining insights into how impacts might vary for different types of households or customary land users and the reasons why. As important, these studies also provide insights into the role and functioning of customary land governance and administration systems that are developed to support the mapping and certification of customary land

³ See: <https://pmrczambia.com/wp-content/uploads/2021/11/Analysis-of-the-National-Lands-Policy-Infographic.pdf>

⁴ Persha, L., P. Bui, and M. Albornoz (2022) *Conducting Randomized Controlled Trials (RCTs) to Evaluate the Impact of Land and Resource Governance Sector Interventions: Strengths, Practical Challenges, and Best Practice Guidance*. Washington, DC: USAID Communications, Evidence and Learning (CEL) Project.

rights, and how donor-supported programming can effectively strengthen and build sustainability for these processes over the longer term.

TGCC ACTIVITY AND EVALUATION BACKGROUND

USAID'S TENURE AND GLOBAL CLIMATE CHANGE ACTIVITY IN ZAMBIA: 2014-2018

The USAID-supported Tenure and Global Climate Change (TGCC) project was a five-year activity that identified and tested models to strengthen resource tenure, governance and property rights as they related to global climate change mitigation and adaptation efforts.⁵ TGCC was implemented by Tetra Tech under the Strengthening Tenure and Resource Rights (STARR) IDIQ as a five-year (2013-2018) program that operated in several countries and contexts. The program supported USAID development objectives of improved resource governance, reduced rural poverty through improved agricultural productivity of smallholders, improved natural resource management, and improved resilience of vulnerable households.

In Zambia, one aim of the TGCC activity was to explore the relationship between secure resource tenure and the adoption of agroforestry practices. As part of this, the activity piloted customary land mapping and certification for households, village land governance and administration processes, and provisioning of agroforestry extension services. This activity was implemented in 277 villages across five customary chiefdoms in Chipata District over a 3.5 year intervention during 2014-2018. Ultimately, TGCC worked in 541 villages and provided customary land certificates for 17,871 parcels across five chiefdoms, covering 190,297 hectares.⁶ Fifty-two percent of those parcels were held or co-held by women, and 20 percent were solely women-owned. The work in four of those chiefdoms (Maguya, Mkanda, Mnukwa and Mshawa) is the focus for this impact evaluation.

TGCC's activity in Chipata District consisted of two main components:

(1) A **Land Tenure** intervention that raised awareness on customary land rights and governance, established Village Land Committees in villages, conducted participatory mapping of household customary land parcels, and issued Customary Land Certificates (CLCs) to households;⁷ and

(2) An **Agroforestry** intervention that provided agroforestry extension services, established farmer groups and utilized a lead farmer approach to promote planting of agroforestry species on cropland, with a focus on *Faidherbia albida* (Musangu) and *Gliricidia sepium* (Gliricidia).



ILRG

⁵ Sommerville, M. and E. Guthe. 2018. *Tenure and Global Climate Change Final Report*. Washington, DC: USAID Tenure and Global Climate Change Program.

⁶ Per TGCC documentation. Program resource documents available at: <https://land-links.org/project/tenure-global-climate-change-zambia/>

⁷ Additional details on this component: https://www.land-links.org/wp-content/uploads/2016/09/USAID_Land_Tenure_World_Bank_2016_Zambia_Open_Source.pdf

The land tenure component was implemented by the Chipata District Land Alliance⁸ (CDLA) and the agroforestry component was implemented by Community Markets for Conservation (COMACO). USAID independently commissioned a randomized controlled trial (RCT) impact evaluation of TGCC at the time of activity design, to obtain rigorous evidence-based learning on the impacts of the customary land certification process and the potential role of tenure security in increasing farmer uptake of agroforestry and other CSA practices. The TGCC IE was designed under USAID's Evaluation, Research and Communication (ERC) project and the IE design team worked in collaboration with TGCC implementers during TGCC activity design to harmonize implementation plans with that of the RCT IE. Through this process, villages across four of the five chiefdoms in Chipata District were randomized to receive one of four combinations of the TGCC intervention: the Land Tenure component only, the Agroforestry component only, the join Land Tenure + Agroforestry components, or no TGCC programming (control group).

POST-TGCC IMPLEMENTATION UNDER ILRG: 2018 - 2019

After the TGCC activity end, USAID supported the expansion of the TGCC Land Tenure component to villages that had received only the Agroforestry component or no programming at all, in three⁹ of the four chiefdoms that were the focus of the TGCC intervention. This activity also aimed to complete land documentation for any other villages that had not been fully completed under TGCC, including those where CLCs had yet to be issued back to villagers by TGCC activity end across the three chiefdoms. The support was a component of the USD\$3.8 million Integrated Land and Resource Governance (ILRG) task order under the Strengthening Tenure and Resource Rights II (STARR II) Indefinite Delivery / Indefinite Quantity contract.

The ILRG programming used the same approach as TGCC and was implemented by the same local implementing partner, Chipata District Land Alliance. The ILRG activity particularly sought to improve restrictive gender norms around women's land and resource rights and further develop the capacity of customary authorities, government and civil society to support communities in documenting and administering land and resource rights.¹⁰

Building on the experiences under TGCC, ILRG's Year I Annual Workplan highlighted two key challenges the activity aimed to better understand and potentially address:¹¹

1. Benefits that households and communities can access as a result of having documented land rights, with a particular focus on women and youth;
2. Financial and technical capacity and overall sustainability of the community-level land governance and administrative systems the activity supported, beyond USAID activity lifetime, and that of supporting district level service providers. This included a particular focus on sustained capacity to update land certificates and work with the land administration data generated by the Activity.

As part of this, the activity developed and tested a process for updating CLCs in two of the four chiefdoms (Mkanda and Maguya), via a consultative process with chiefs and village land committees. This

⁸ CDLA is a civil society organization that focuses on advancing social and economic development by documenting the land rights of citizens in the Eastern Province of Zambia.

⁹ Maguya, Mkanda and Mnuakwa chiefdoms. No ILRG follow-on programming was conducted in Mshawa chiefdom. Per ILRG, activities in Mkanda chiefdom were also eventually restricted.

¹⁰ https://www.usaid.gov/sites/default/files/documents/FINAL_ILRG_Fact_Sheet_JUNE_2022.pdf

¹¹ https://land-links.org/wp-content/uploads/2020/06/ILRG-1st-Work-Plan_approved-508.pdf

included trainings for indunas and headpersons on records management related to the CLCs.¹² The ILRG extension work also continued land demarcation and related documentation in Mkanda and Maguya chiefdoms, via an 18-month award to CDLA that began in May 2019.¹³ With respect to women's land rights, ILRG achieved gender parity in CLC issuance,¹⁴ as was also the case under TGCC.

Ultimately, per ILRG quarterly reports, the activity was still unable to obtain chief agreement to move forward with signing CLCs and distributing them back to households in two of the four TGCC chiefdoms.¹⁵ As a result, households in villages from these two chiefdoms that received the Land Tenure component under either the TGCC or ILRG programming received participatory land mapping and documentation of their fields, together with related land services programming, but had not received CLCs by the time of IE follow-on data collection in 2021.

2017 ENDLINE IMPACT EVALUATION OF TGCC

An IE of the TGCC activity in Zambia was implemented under USAID's Evaluation, Research and Communication (ERC) project during 2014-2017. The primary objective of the TGCC IE was to determine if and how TGCC's land tenure intervention strengthened smallholder tenure security and resource rights and, in turn, led to increased farmer investment and agricultural productivity, adoption of agroforestry and other CSA practices, and overall livelihoods. The TGCC interventions and associated IE presented an important learning opportunity for USAID and the global development community, as one of few RCTs situated to contribute evidence on a long-standing set of interwoven development challenges, including (1) use of customary land certification to strengthen farmer tenure security, farm investments and agricultural productivity; and (2) the role of tenure security in improving historically low agroforestry adoption rates for rural smallholders.

The IE of the TGCC activity was designed as a 4-arm RCT. Villages within each of four chiefdoms were randomized into one of four treatment categories: Agroforestry, Land Tenure, joint Land Tenure and Agroforestry, or Control. The RCT was designed to enable measurement of the individual and combined effects of the two interventions. Baseline data was collected during June-August 2014, prior to the start of the TGCC program. Endline data was collected three years later during June-August 2017, following the completion of TGCC activities. The 2017 endline analysis drew on data collected via household surveys, village headman or headwoman surveys, key informant interviews with lead farmers and village land committee members, and focus group discussions with women and youth.

The TGCC IE was designed to report on indicators across five outcome families: 16 tenure security; land governance; agroforestry uptake and survivorship; agricultural investment; and agricultural productivity and livelihoods. The 2017 endline results were reported in terms of the average treatment effects.

¹² However, per implementing partners, the development of the administrative software was delayed and so this element was only partially rolled-out by follow-on IE data collection.

¹³ ILRG 2019 and 2020 quarterly reports. Note that in the interim years after the conclusion of TGCC and before the ILRG support began, CDLA continued to conduct land certification work in the District independently without USAID support.

¹⁴ <https://land-links.org/wp-content/uploads/2021/03/ILRG-Zambia-VVEE-Key-Achievements-2018-2020.pdf>

¹⁵ These were Mnuakwa and Mshawa chiefdoms. Per the Jan-March 2020 quarterly report: "CDLA continues to face challenges with finalizing signature and distribution of certificates within Mnuakwa Chiefdom. Chief Mnuakwa has continued to note concerns over illegal land occupation in his chiefdom, including from individuals from Malawi. ILRG has provided spatial and personal information for all parcels demarcated to date, but so far distribution has not occurred." (p24)

¹⁶ Huntington, H. et al. 2018. *Tenure and Global Climate Change (TGCC) Evaluation Report*. USAID. The Cloudburst Group.

Impact heterogeneity was also examined for five types of households: female-headed, youth, elderly, poor and land constrained households.

The 2017 endline findings, which measured impact results approximately six months after the conclusion of TGCC activities, suggested the TGCC land tenure intervention did increase household perceptions of tenure security. Treatment households perceived that their fields were more secure from reallocation or unauthorized appropriation from both internal and external threats in the short and longer term future.¹⁷

Key findings from the 2017 endline IE of TGCC included:¹⁸

- Significant positive impacts of customary land registration on short and long term perceived tenure security and decreased perceived expropriation risk by internal and external actors;
- A significant positive impact of the agroforestry extension program on uptake of agroforestry tree planting, although the actual rate of tree planting and seedling survival were low;
- No evidence that greater perceived tenure security led to a higher rate of agroforestry uptake;
- No evidence of impacts on land governance, agricultural productivity, or livelihoods, which were considered longer-term outcomes at endline;
- Positive impacts of the Land Tenure intervention for two subgroups of interest, female- and elder-headed households, on tenure security, land governance, agroforestry uptake and field investment.

FOLLOW-ON IMPACT EVALUATION OF TGCC

The relatively small magnitude of impacts at 2017 endline, and lack of evidence for impacts on longer-term indicators such as crop yields and welfare impacts, was plausible given the short timeline between the conclusion of TGCC activities and the 2017 endline data collection. In addition, although TGCC's Land Tenure activities had concluded some six months prior to the 2017 endline, the distribution of CLCs to households continued until a few months before the endline data collection and the certificates had not yet been received by many households in treatment villages by that time. This period could have been too short for households to start to experience substantial impacts from the program. The endline evidence for tenure security impacts also indicated that hypothesized early steps in the customary land formalization causal pathway appeared to be underway.

USAID commissioned this follow-on IE in late 2019,¹⁹ to establish longer-term impacts of the TGCC activity some three or more years after the conclusion of TGCC, deepen learning from efforts to strengthen women's land rights and access to land, and contribute to informing USAID strategy and programming in land and related sectors.²⁰ The follow-on evaluation is intended to build on evidence obtained from the 2017 endline IE of TGCC. It aims to estimate longer-term impacts of the TGCC (2014-2018) and post-TGCC customary land documentation programming conducted under ILRG

¹⁷ Ibid. The land tenure intervention was found to have raised the probability that households think encroachment or unauthorized appropriation is "impossible" by 5 to 6 percentage points for the following sources of expropriation: headman, neighboring villages and other households within their home village.

¹⁸ Ibid.

¹⁹ Data collection for the follow-on IE did not move forward until 2021, due to the COVID-19 pandemic.

²⁰ The follow-on IE was commissioned after the NORC team conducted desk-based scoping to examine feasibility, given issues with treatment fidelity highlighted at 2017 endline and anticipated post-TGCC treatment of control villages. See: Protik, A., G. Haugan and L. Persha. 2019. *Feasibility Assessment Report: Follow-on Data Collection for the Tenure and Global Climate Change (TGCC) Zambia Impact Evaluation*. USAID. Communications, Evidence and Learning Project.

(2018-2019), some seven years after the start of the TGCC activity and two to five years after household receipt of participatory land mapping and CLCs.

In addition to revisiting the core learning interests for the IE per its design, the 2021 follow-on IE round of data collection and analysis also expanded its focus to accommodate additional USAID learning interests. These included expanded qualitative and quantitative data collection and impact analysis coverage to assess TGCC's impacts on:

- Household food security;
- Women's land issues and empowerment, including whether improvements to women's land tenure security as a result of customary land mapping and certification lead to improved farm investments, agricultural productivity, and/or economic opportunities for women over the longer-term;²¹ and
- Linkages between customary land certification and gender-based violence/intimate partner violence (GBV/IPV).



USAID FLICKR 2017

TREATMENT FIDELITY OF THE LAND TENURE INTERVENTION

Treatment fidelity refers to the degree to which a planned intervention is implemented as intended, including whether the intervention components were received by the intended beneficiaries. Greater treatment fidelity is associated with a higher likelihood of detecting impacts, stronger confidence in the impact results, and greater learning potential from the evaluation. Evaluation teams assess treatment fidelity and its implications for the impact results because it provides insights into the internal and external validity of the evaluation, improves interpretation of results (for example, why impacts may be weaker than expected) and highlights where evaluation teams may need to consider additional analytic approaches to obtain less biased estimates of impacts. It can also help to identify and better understand implementation challenges that may need to be addressed in future programming or scale-up.

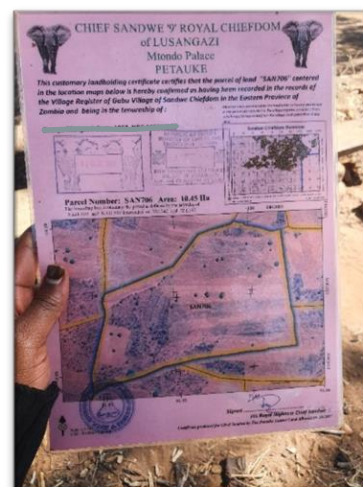
At 2017 endline, two sets of issues contributed to varying treatment fidelity across chiefdoms for the Land Tenure component of TGCC, and these were still relevant for the 2021 follow-on IE. Because they pose some complications for the impact analysis and results interpretation, they are discussed in some detail here. First, there was an unanticipated chiefdom-level variation in the Land Tenure treatment whereby some villages received the full intervention and others received all components of the intervention except for the CLC document. The reason was that chiefs in two of the four chiefdoms ultimately refused to sign and distribute the CLCs to many or all villages in their chiefdom, ostensibly

²¹ The 2017 endline found that female-headed households experienced improved tenure security and farm investment due to land certification, but whether this leads to longer-term improvements in women's agricultural production or livelihoods is a critical knowledge gap.

linked to governance issues at the level of the chiefdom.²² As a result, not all villages within the Land Tenure treatment group had received CLCs by endline or 2021 follow-on. Second, and related to the above issue, one chief also decided that non-Zambians or land users who did not have a National Registration Card could not be eligible to receive a CLC.²³ This was less common but also resulted in some villages within the Land Tenure treatment group where not all households within the village were able to obtain to the CLC.

As a result, by the time of IE endline data collection in July 2017, the proportion of surveyed households that reported having received a CLC for at least one of their fields varied from 50 to 54 percent among households in villages that received either the Land Tenure or Land Tenure + Agroforestry intervention. This was roughly half of the expected sample for both.²⁴

These variations in CLC implementation by chiefdom diverged from TGCC's plan, but the RCT IE design renders it feasible to estimate internally valid impacts under this situation. Due to the random assignment of villages within each chiefdom into the different treatment arms, comparison of outcomes for treatment and control villages within each chiefdom provide unbiased impacts for each chiefdom. Impact estimates for the IE sample as a whole, estimated as the average impact across all four chiefdoms, represent unbiased impacts for the TGCC project as a whole.



Customary Land Certificate

At follow-on planning, it was anticipated that ILRG would complete participatory land mapping, registration and CLC issuance for all Control and Agroforestry villages in three of the four TGCC IE chiefdoms, and also work to obtain CLC distribution to eligible households²⁵ in those chiefdoms. Doing so would enhance the IE's ability to discern the magnitude of impacts from full mapping and certification, which could be different and potentially stronger than those obtained from mapping alone. However, as ILRG was also not able to obtain chief agreement to move forward with CLC distribution in the remaining chiefdoms, the Land Tenure and joint Land Tenure + Agroforestry treatment groups at follow-on still contain a mix of households that had received either partial (no CLCs) or full implementation of the Land Tenure intervention.

Because random assignment was carried out by chiefdom, it was possible at follow-on to exclude one or two of these chiefdoms from the analysis and retain IE validity. However, as chiefdoms are dropped from the sample the statistical power to detect impacts decreases, and the context and learning to which the results apply diminishes. The NORC team's scoping work at follow-on showed that the

²² Per communication with ILRG, chief refusal to move forward related to concerns about ceding control over land in one chiefdom. In another, the chief ostensibly wanted all villages to receive the land mapping and certification intervention (including control villages) before households from any village received a CLC, but ultimately also did not authorize CLC distribution after control villages were mapped. These issues relate to varying support and approaches by chiefs and are deemed outside of TGCC's manageable interest.

²³ This was particularly relevant for areas of chiefdoms that border Malawi.

²⁴ NORC's follow-on qualitative data collection also confirmed that some households perceived the receipts they received from TGCC to eventually claim their CLC as equivalent to the CLC itself. The endline survey contains six different variables that can be used to measure household participation in mapping and certification, and additional variables to track when the household received a CLC and confirm possession. Coverage on the same across village leader and VLC surveys also allows these issues to be examined in a number of ways and from a range of different sources.

²⁵ Typically, this excluded non-Zambian households.

resulting reduction in statistical power would mean that only large effects would be detectable through the impact analysis. Excluding one or more chiefdoms would also alter the questions and learning to which the results would apply, further reducing the learning value of the IE. Rather than providing insights on average impacts of Land Tenure, Agroforestry, and their combined programming across a range of implementation contexts, the results would be restricted to contexts in which implementation was smoothest and chiefs were most cooperative regarding the interventions. In practice, this could represent only a small portion of real-world contexts where customary land formalization is likely to be implemented, reducing the utility of the IE results for future programming and policy applications.

EVALUATION PURPOSE, AUDIENCE, AND USES

PURPOSE AND USES

The purpose of this follow-on IE is to provide USAID with evidence of the longer-term impacts of the TGCC activity on six different outcome families: tenure security; land governance; agroforestry uptake and other CSA investments; agricultural productivity; livelihoods; and food security and women's empowerment. The evaluation at follow-on has a particular focus on providing evidence-based learning on how customary land mapping and certification impacts women's land rights and control of land, tenure security, agricultural investments, livelihoods and empowerment. The follow-on IE was also designed to contribute to the evidence base for impacts on household food security and linkages between customary land certification and gender-based violence/intimate partner violence (GBV/IPV).

The follow-on evaluation aims to assist USAID/W, USAID/Zambia and the Government of Zambia to better understand the impact of informal certification of customary lands in the Zambian context. The IE findings may help to inform implementation of the government's 2021 National Land Policy,²⁶ with a focus on strengthening women's and customary land rights, and USAID activity design and overall portfolio planning in the land sector.

AUDIENCE

The primary audiences for the IE findings are USAID/DDI/EEI and the Zambia Mission, together with the Government of Zambia. Secondary audiences include TGCC and ILRG implementing partners, CDLA and other District Land Alliances, donors and practitioners in land sector and working to document customary land rights, traditional authorities (House of Chiefs), and the Ministry of Lands and Natural Resources. More broadly, the IE is relevant to donors involved in next generation land documentation efforts in areas of Zambia under customary tenure, and the broader land sector community of practice who utilize and contribute to the evidence base on informal land certification in customary systems and related land tenure strengthening interventions.

²⁶ Zambia's National Land Policy was launched in May 2021 and aims to improve access and security of tenure over land, among other objectives. A National Land Title Program currently aims to document and administer Certificates of Title to owners of state land, but there is currently no corresponding program to issue land documentation for users of customary land in the country.

EVALUATION QUESTIONS

The follow-on IE reports out on the evaluation questions and development hypotheses that were developed at IE design in 2014 and approved by USAID at that time, together with new learning interests that USAID introduced for the 2021 follow-on round.

The TGCC IE was designed to address evidence and knowledge gaps and to inform future programs and policy formulation by measuring the direct and joint impacts of the TGCC land mapping, certification, governance and agroforestry extension interventions on three types of outcomes:

- Changes in household perceptions of tenure security over their smallholdings and reasons why;
- Planned and actual agricultural investment resulting from perceived tenure security, including adoption of agroforestry and related CSA activities;
- Outcomes around land governance, agricultural productivity and livelihoods, which were expected to accrue over longer time horizons and are of broader interest to USAID; and
- Linkages between tenure security and agroforestry uptake.

Additional targeted learning interests for the 2021 follow-on evaluation include:

- Impacts of the TGCC interventions on:
 - Household food security and potential pathways;
 - Women's land issues and empowerment, including whether improvements to women's land tenure security as a results of customary land mapping and certification led to improved farm investments, agricultural productivity, and/or economic opportunities and other forms of empowerment for women over the longer-term;²⁷
- Reasons for changes in agroforestry uptake;
- Household interest in and knowledge about how to update CLCs, together with capacity and functioning of Village Land Committees established by TGCC; and
- Potential linkages between customary land certification and gender-based violence/intimate partner violence (GBV/IPV).

EVALUATION DESIGN

THEORY OF CHANGE

Building on long-standing economic theory regarding the role of property rights in improving household livelihoods, especially in rural agricultural settings, customary land formalization interventions in the development space work from the assumption that when individuals or households have stronger land rights and tenure security over land they customarily use, they will have a greater incentive to invest in the land in ways that enhance its productivity, value and their own land-based incomes. Over the longer term, households' land investments and improvements to their agricultural productivity are also anticipated to improve their food security and overall economic wellbeing.

²⁷ The 2017 endline found that female-headed households experienced improved tenure security and farm investment due to TGCC's land mapping and certification, but was not positioned to fill a critical knowledge gap on whether this leads to longer-term improvements in women's agricultural production or livelihoods.

Much prior work has summarized the underlying theory, assumptions and causal pathways that illustrate how such interventions may lead to desired development outcomes and impacts over the short and long term.²⁸ Over the short and medium term, participatory land mapping and documentation is expected to improve land users' land tenure security, possession of formal documentation of land rights and incidence of land conflicts. This greater confidence in land users' ability to use and maintain rights to their land over the long term is anticipated to incentivize them to make field investments that require greater labor, inputs or longer time horizons to see benefits, including engaging in agroforestry. In turn, these investments are expected to improve agricultural productivity on the land and lead to more sustainable land use and increased land-based income. In the TGCC context, the interventions are also anticipated to potentially improve household food security through agricultural productivity or income gains, and may also lead to changes in credit access, land rental markets and aspects of women's empowerment. USAID also expects that TGCC's sensitization of households and village leadership on land laws and rights, and support to establishment and functioning of a land register, village land map and Village Land Committees in villages will improve the capacity and equity of land allocation and governance in villages through the existing customary system.

EVALUATION DESIGN OVERVIEW

The TGCC IE uses a factorial RCT design²⁹ to assess the impacts of the TGCC activity. Prior to the start of TGCC implementation in 2014, an IE team worked with TGCC staff and chiefdom authorities to randomly assign each of 246 villages across four different chiefdoms in Chipata District to receive one of four potential sets of activities. A four-arm cluster-randomized³⁰ RCT design was implemented to test the individual effects of the Land Tenure and Agroforestry components of the TGCC activity and explore their interactions. The TGCC activities were village-wide interventions that were implemented in four different chiefdoms of Chipata District (Maguya, Mkanda, Mnukwa and Mshawa), and so the village is the level of randomization for the IE design. In each chiefdom, villages were randomly assigned to one of four treatment groups, as shown in Figure I, such that households in the respective treatment group were offered either TGCC's Land Tenure component, Agroforestry component, joint Land Tenure + Agroforestry component, or no program activities.

This program implementation and IE design allows the evaluation team to assess the average household-level impacts of each of the Land Tenure and Agroforestry components alone, and their joint implementation. Balance tests conducted at baseline and endline confirmed there were no meaningful differences among the different treatment groups on the basis of observable household and village characteristics. This confirmed that the randomized assignment of villages into the four groups resulted in groups that were largely similar to each other prior to the start of TGCC activities, as is desirable for the validity of the RCT design.³¹

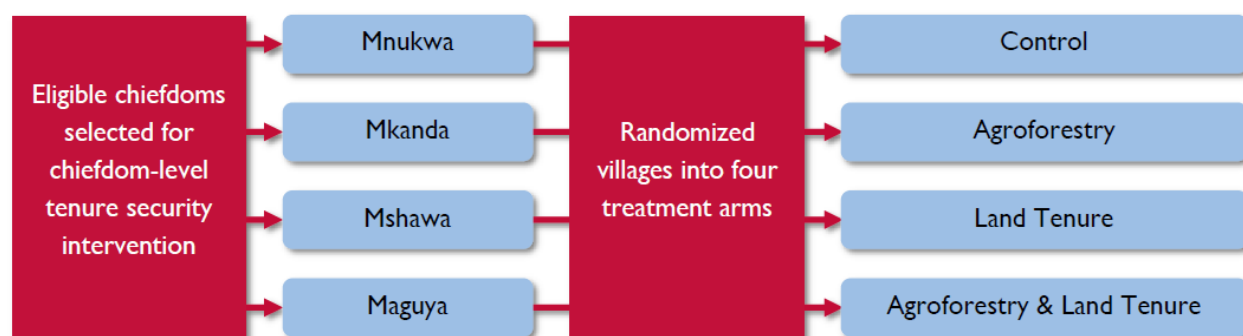
²⁸ For example, see Meinzen-Dick et. al. 1997; Deininger 2003; Place 2009; Meinzen-Dick 2009; Holden and Ghebru 2016; Lawry et. al. 2017; Higgins et. al. 2018; Lisher 2019; Meinzen-Dick, Quisumbing, Doss et. al. 2019; Persha et al 2022.

²⁹ A factorial design allows researchers to evaluate the effects of each of the two interventions alone, and their combined effects. In this case, the interventions of interest are the Land Tenure and the Agroforestry components of TGCC.

³⁰ Cluster-randomized RCTs are used when an intervention is implemented to groups of people or households rather than to individuals. Randomization typically occurs at the level of the intervention, which is villages for TGCC.

³¹ See the TGCC IE design report, baseline report and pre-analysis plan for balance, power and additional IE design and randomization details.

Figure 1: TGCC Program Implementation and IE Design



(Source: TGCC IE Pre-Analysis Plan)

As for baseline and endline, the 2021 follow-on IE also employs a mixed-method approach. Quantitative data for impact and related statistical analysis is collected via household and village headperson surveys. Qualitative data is collected via key informant interviews (KIs) and focus group discussions (FGDs) with lead farmers, village land committee members, and women and men from a sub-set of TGCC implementation village to obtain additional depth of information on key program implementation and related issues, understand reasons for any observed impacts or lack thereof, unintended consequences, and enable additional exploration of potential mechanisms and the role of context factors in achieving program impacts or not across the range of outcome families covered by the IE.

OUTCOME FAMILIES, HYPOTHESES AND INDICATORS

The IE team uses statistical models to estimate TGCC's causal impacts, drawing on a set of indicators across six different families of outcomes. The indicators are used as dependent variables in causal statistical models that estimate the impacts of TGCC. The 2021 follow-on IE maintains the same outcome families, and most of the hypotheses and indicators from the 2017 endline. It also adds additional ones that are new for the 2021 follow-on round (Table I). In addition to estimating average effects of the TGCC interventions on households for each of the indicators in Table I, the IE team also conducted heterogeneity analysis to explore how impacts may have varied for five population sub-groups of interest: female-headed households, youth-headed households, elderly-headed households, poorest-households and land-constrained households.³²

³² Based on household characteristics at 2014 baseline.

Table 1: Outcome Families, Hypotheses and Indicators³³

Outcome Family	Hypotheses: Households in villages receiving the TGCC intervention have...	Indicators
7. Tenure Security	H1: ...different levels of village- wide incidence of land conflicts. H2: ...perceive different levels of tenure security.	- Indices of HH perception of: - Overall tenure security - Long-term tenure security - Short-term tenure security - Perceived expropriation risk from internal actors - Perceived expropriation risk from external actors - HH experienced a land dispute with 3 years of survey - HH perceived risk of land loss from each of 6 potential sources
8. Land Governance ³⁴	H3: ...perceive different levels of transparency regarding the land allocation process and accountability of land allocation decision makers. H4: ...different levels of satisfaction regarding the resolution of land disputes.	- HH believes: - Leaders are trustworthy on land decisions - Leaders are accountable - Land decisions are fair - Land decisions are transparent - Land rules are clear - Leaders protect natural resources - HH participates in land related meetings - HH feels women, elderly, poor, minority tribe members, vulnerable groups are disadvantaged in land decisions (separate indicator for each)
9. Uptake of Agroforestry ³⁵	H5: ...greater uptake of agroforestry.	Household engaged in agroforestry on at least one field
CSA Field Investment	H7: ...greater uptake of climate-smart agriculture (excluding agroforestry). H8: ...greater uptake of CSA field investments.	- HH practiced: - Zero tillage - Ridging - Planting basins - Composting - Crop rotation - HH left a field fallow - Length of fallow period - HH used synthetic fertilizer
10. Agricultural Productivity	H9: ...higher agricultural productivity and crop yields.	- Household reported experiencing improved crop growth as a result of agroforestry - Household reported experiencing improved crop yields as a result of agroforestry
11. Livelihoods	H10: ...different livelihood and welfare outcomes.	- Household rented out land - Household obtained a loan from a formal credit source

³³ We list primary and secondary indicators that were reported out on in the 2017 endline IE findings chapters. See the 2017 TGCC IE Endline Report, Annex 6, and Pre-Analysis Plan for additional details on these indicators.

³⁴ The 2021 analysis drops two land governance indices from 2017 endline due to the 2021 IE team's inability to reproduce these indices using endline documentation provided to the 2021 IE team.

³⁵ The 2021 analysis drops a hypothesis (H6) and indicator from 2017 endline related to seedling survival rates for this outcome family, given low N and high variability, poor respondent recall, insufficient power, and lack of relevance for follow-on.

Outcome Family	Hypotheses: <i>Households in villages receiving the TGCC intervention have...</i>	Indicators
12. Food Security and Women's Empowerment**	HI1: ...increased food security. HI2: Female primary decisionmakers in households in villages receiving the TGCC intervention have higher perceived tenure security and control over land. HI3: Wives in households in villages receiving the TGCC intervention have different risk of intimate partner violence (IPV)	- Household Hunger Scale score - Number of months HH experienced hunger - Female primary decisionmaker in HH: - Perceived tenure security - Experienced a land dispute in 3 years prior to survey - Is familiar with CLCs - Has a CLC - Believes land laws protect women's land rights - Is confident she will inherit land - Has own agricultural land - Contributes to HH agricultural decisions - Number of assets female primary decisionmaker in HH owns jointly - Wife in HH reports experiencing any form of controlling behaviors, emotional, physical or sexual violence

** New outcome family added for the 2021 follow-on IE.

SAMPLE DETAILS AND QUANTITATIVE DATA COLLECTION (2021 ROUND)

The sample size for the TGCC IE was determined during the IE design phase in 2014 via a power analysis that sought to ensure the evaluation would have sufficient statistical power to detect relatively small effect sizes or larger for most of the outcomes of interest. Consistent with IE design,³⁶ NORC's power analyses for follow-on scoping also indicated that the four-chiefdom sample for the IE was powered to relatively fine-scale and policy relevant effects for most outcomes, with minimum detectable effects ranging from 0.15 and 0.25 standard deviations from control group means.

The IE design aimed for 15 households to be surveyed in each village although the actual number of households surveyed per village varies somewhat across villages and is slightly lower in some villages where the number of households in the village was less than 15.³⁷ The sample across the four chiefdoms was 2,880 households at baseline and 2,820 at endline, including replacement households. The follow-on was conducted as a panel survey, with the follow-on team aiming to resurvey as many households and respondents within households as possible from the baseline and midline samples. If the original respondent in a household could not be re-interviewed, they were replaced with another adult member of the household who was knowledgeable about the household's farming and land issues. If an entire household from a previous survey round could not be identified or interviewed, they were not replaced.

The household panel dataset at 2017 endline was 2,417 households, which included households that were surveyed at 2014 baseline and 2017 endline.³⁸ The final sample for the 2021 follow-on round was 2,570 households across 246 villages, of which 2,313 were a panel across baseline and follow-on rounds

³⁶ See TGCC IE Design Report and Pre-Analysis Plan.

³⁷ The 2017 endline sample included 249 villages but 3 of these had merged by follow-on, resulting in a final sample of 246.

³⁸ The 2021 follow-on round did not collect data in Saili chiefdom, which was not part of the RCT and also not included in the 2017 IE endline analysis.

only (2014 and 2021), and 2,076 were a full panel of households across all three rounds (2014, 2017, 2021).³⁹

The sample at baseline and endline was split roughly evenly across the four treatment arms, with approximately 60 villages in each group (Table 2). For follow-on, it was initially anticipated that the post-TGCC implementation of the Land Tenure component to all Control and Agroforestry villages would result in village sample at follow-on roughly evenly split across Land Tenure and joint Land Tenure + Agroforestry treatment groups.⁴⁰ Instead, the uneven implementation of the Land Tenure component across chiefdoms during the post-TGCC resulted in the maintenance of all four treatment groups, but substantial sample size imbalance across the treatment arms at follow-on that were aligned with chiefdom.⁴¹ Table 3 shows the final household sample for 2021 follow-on.

Table 2: Village Sample by Chiefdom and Treatment Arm

	Baseline (2014)					Endline (2017)					Follow-On (2021)				
	LT	Ag	LT+Ag	Control	Overall	LT	Ag	LT+Ag	Control	Overall	LT	Ag	LT+Ag	Control	Overall
Maguya	12	12	14	11	49	12	12	14	11	49	23	0	25	0	48
Mkanda	13	16	14	17	60	13	16	14	17	60	27	0	29	0	56
Mnukwa	13	15	14	15	57	13	15	14	15	57	29	0	28	0	57
Mshawa	23	19	22	19	83	23	19	22	19	83	23	20	22	20	85
Total	61	62	64	62	249	61	62	64	62	249	102	20	104	20	246

Table 3: Household Sample by Chiefdom and Treatment Arm

	Baseline (2014)					Endline (2017)					Follow-On (2021)				
	LT	Ag	LT+Ag	Control	Overall	LT	Ag	LT+Ag	Control	Overall	LT	Ag	LT+Ag	Control	Overall
Maguya	166	166	191	128	651	178	163	198	142	681	292	0	326	0	618
Mkanda	128	182	136	142	588	132	167	125	154	578	270	0	274	0	544
Mnukwa	162	170	152	165	649	168	178	146	175	667	298	0	279	0	577
Mshawa	275	210	275	232	992	241	181	256	216	894	215	182	230	204	831
Total	731	728	754	667	2880	719	689	725	687	2820	1075	182	1109	204	2570

Within each household, the IE was designed to collect quantitative information from the household head⁴² via a survey. For the 2021 follow-on IE, an additional survey module was also administered to the primary decision-maker of the opposite gender, for male-headed households.

At follow-on, the leader survey was conducted with 246 headpersons, one from each of the 246 villages surveyed. Consistent with endline, 88 percent (N=217) of these respondents were men and 12 percent (N=29) were women. On average, the headperson was 60 years old and 67 percent (N=165) had completed grade seven. Nearly half of the village leaders surveyed had been in their role for at least 10 years. Another 22 percent (N = 32) took over leadership during the TGCC years (2014-2017), while 25 percent had become the headman or headwoman of their village since TGCC concluded (N=36). 61 percent (N=151) were born in the village they lead. Among those who were not, they had lived in the

³⁹ Excludes 237 households from 2017 endline that could not be located or reinterviewed at 2021 follow-on.

⁴⁰ And within these two treatment groups, roughly half of the villages would have received the Land Tenure component in 2014-2015, and the other half in 2018-2019.

⁴¹ This introduces some additional identification challenges that are discussed in the analytic approach section.

⁴² In the TGCC implementation context, this is typically a male household head.

village for 32 years, on average. Similar to 2017 endline, headpersons reported an average of 58 households and 268 people living in their village during 2021 data collection round.

The 2021 follow-on data collection took place during September and October 2021 and followed a similar approach as the two previous data collection rounds in 2014 and 2017. Palm Associates, a Lusaka-based data collection firm, conducted the follow-on data collection in close coordination and under the direct oversight of the NORC IE team. Preparations for the follow-on data collection included follow-on instrument pre-testing and piloting, a 2-day supervisor training, 7-day enumerator training, and 2-day qualitative team training led by NORC together with Palm. Data collection team members were all fluent in English and Chinyanja, and approximately half were female. Follow-on survey data was collected via a cloud-based mobile data collection via tablets, using SurveyCTO.

Ethical approval for the study was received from NORC's Institutional Review Board in January 2020 (amended in July 2021), and from the University of Zambia Biomedical Research Ethics Committee Institutional Review Board in Zambia in August 2021. Verbal informed consent was obtained from all study participants prior to survey or qualitative interview/discussion.

DATA QUALITY ASSURANCE

The NORC follow-on IE team employed several strategies to ensure data quality, including: in-house programming and testing of the survey instruments in SurveyCTO to minimize data entry errors, ensure survey flow and logic, and improve quality control; pre-testing and piloting of all instruments and qualitative tools in the field prior to follow-on data collection. NORC provides close oversight of data collection teams during survey fielding, including conducting high-frequency validation and reliability checks, daily data uploads during quantitative data collection and weekly production reports. The NORC team regularly reviewed the survey data for quality and provided necessary feedback to the local data collection firm during survey fielding. Supervisory observation of one in six household surveys, backcheck surveys for each of the three survey instruments (5 backcheck surveys were conducted in each village, consisting of three household surveys and one or both of the VLC and YGL surveys).

ATTRITION

The follow-on IE team anticipated that it would not be possible to locate and resurvey all of the households from baseline, given that seven years had elapsed between those data collection rounds. Where a household respondent was not present or available, enumerator teams at follow-on replaced those respondents with another adult household member who was knowledgeable about the household's farming and land issues. Enumerators made three attempts to survey each household. If no adult household member was available or the household could not be located by the third attempt, the household was considered untrackable. The rate of household attrition from the baseline sample was 19.7 percent at follow-on, a modest increase over the 16.1 percent attrition experience at endline. At follow-on, the attrition rate from the 2014-2017 household panel was slightly lower, at 14.0 percent.⁴³ These rates aligned with evaluation team expectations, given the number of years that had passed since baseline and attrition rates at endline. Among the 340 households that attrited out from the baseline-

⁴³ The data firm at follow-on attempted to locate and reinterview the 450 households from baseline that could not be located or interviewed at endline. Among those, the follow-on team was able to successfully locate and reinterview 237 households, thus reducing the number of households with observations at baseline only to 213.

endline panel sample at follow-on, the most common reason was that the household had dissolved⁴⁴ and relocated from the village.

The follow-on IE team conducted tests to check for attrition bias, which provided insights on whether there were differences in the attrition rate correlated with treatment arm that could introduce bias into the impact estimates at follow-on.⁴⁵ At follow-on, there were no statistically significant differences in the rate of household attrition across the TGCC treatment groups, and treatment status was not a significant predictor of the likelihood of household attrition.

SURVEY INSTRUMENTS

Consistent with the 2014 baseline and 2017 endline data collection rounds, the 2021 follow-on survey data collection consisted of:

1. A **Household Survey**, administered to the household head or adult most knowledgeable about household farming and land issues. This survey lasted approximately 90 minutes.
2. A **Village Leader Survey**, administered to the village headperson. This survey lasted approximately 45 minutes.
3. A **Village Land Committee (VLC) survey**, administered to a member of the VLC if present in the village. This survey lasted approximately 45 minutes.
4. A **Yield Group Leader (YGL) survey**, administered to a lead farmer from the village (administration time approximately 45 minutes).



PALM ASSOCIATES

In addition to the above instruments, the following survey modules were newly administered to households for the 2021 follow-on data collection:

5. A **Wives Module**, to enable the follow-on round to measure key women's outcomes including aspects of women's tenure security, empowerment, intra-household decision-making, control of resources and assets. This was administered to the female primary spouse in the household. This module last approximately 40 minutes.
6. A **GBV/IP Module**, administered to all female survey respondents.

The endline household survey instrument utilized the survey instrument administered at 2017 endline, with the addition of the wives and GBV modules implemented at the end. The NORC team made minor adjustments to the core survey instrument from 2017 endline to improve survey logic and update time periods or years over which recall questions were asked, to be consistent with the follow-on era. A

⁴⁴ In other words, household members had dispersed to various locations and no longer lived together in the sampled village.

⁴⁵ If there is evidence that the TGCC treatment itself affected the likelihood households attrited out of the sample, additional steps should be taken in the statistical modelling to reduce potential bias to the impact estimates.

small number of additional questions were added to gain additional clarity on issues of interest, such as whether households had been affected by district rezoning activities.⁴⁶ No other changes were made.

The Village Leader Survey, YGL and VLC surveys also utilized the same instruments administered at 2017 endline, but dropped several questions that were redundant with household survey data collection or more substantively addressed via qualitative data collection. The wives module was based on the main survey instrument for some elements (e.g., tenure security, and also drew heavily from the Abbreviated Women's Empowerment in Agriculture Index questionnaire (A-WEAI).⁴⁷ The GBV/IP module drew on the Demographic and Household Survey and GBV survey instruments implemented by Landesa⁴⁸, UNIFEM⁴⁹ and the Global Women's Institute.⁵⁰

QUALITATIVE DATA COLLECTION

Qualitative data collection for the 2021 follow-on was conducted in a total of 32 villages (8 villages in each of 4 chiefdoms), concurrent with the household survey data collection. Two gender-disaggregated FGDs of 8-12 participants each were conducted in each of the 32 villages, with women and men, for a total of 64 FGDs. One group KII with up to four landless individuals or non-participants to the TGCC Land Tenure intervention were conducted in 13 villages, for a total of 13 group KIIs.



The KIIs targeted landless

individuals and non-participants in TGCC's land tenure activities in the village, to speak to particular learning interests at follow-on related to why some people may have chosen not to have their land mapped, and whether and how landless individuals in villages may have been affected or potentially disadvantaged by the activity. In practice, the qualitative field teams encountered few to no landless individuals or non-participants in several of the villages in the qualitative sample, and the 13 group KIIs is three less than the planned target of 16. Each group KII included 1-2 individuals.

Villages for qualitative data collection were selected via stratified random sampling on the basis of chiefdom,



⁴⁶ As part of the leader survey, headpersons were also asked whether their village had been affected by any government rezoning activities since 2014. Headpersons from 11 villages (5 percent of village sample) said yes and the rezoning activity had begun in 2017 or later for all but two of those villages. In all cases, however, village leaders said the rezoning had not led to any household displacement or relocation.

⁴⁷ See: <https://weai.ifpri.info/> and <https://www.feedthefuture.gov/the-womens-empowerment-in-agriculture-index/>

⁴⁸ Impact Evaluation of Land Certification in Four Regions of Ethiopia Endline Wives survey.

⁴⁹ UNIFEM. 2008. Baseline Survey on Sexual and Gender Based Violence in Rwanda. United Nations Development Fund for Women.

⁵⁰ The Global Women's Institute. Gender-Based Violence Research, Monitoring, and Evaluation with a Refugee and Conflict-Affected Populations. A Manual and Toolkit for Researchers and Practitioners. September 2017.

treatment group, whether CLCs had been distributed to households in the village or not and whether this was done under TGCC or in the post-TGCC era. The sample also aimed to include villages that were more accessible and less, based on distance to nearest tarmac road. The FGDs and KIs were conducted in Chinyanja by trained moderators using semi-structured instruments to guide the discussion, and translated and transcribed to English for analysis. The qualitative instruments used at follow-on are in Annex A.

ANALYTIC APPROACH

The follow-on IE uses a household panel dataset to assess the longer-term impacts of the TGCC interventions, individually and jointly, on household-level outcomes across six outcome families. Because all households in a given village were eligible to receive participatory land mapping and related services and/or agroforestry extension support, depending on the respective treatment assignment of their village, the main analysis focuses on obtaining intent-to-treat (ITT) estimates of program impacts.

Given identification challenges due to the sample constraints⁵¹, a series of supplemental exploratory regression analyses are also conducted to gain additional insights into the below issues and help build overall confidence in patterns of key findings:

- Patterns of impacts for the subset of Land Tenure households that received a CLC;
- Potential differences in average impacts for households in the TGCC Land Tenure intervention cohort and the post-TGCC cohort (“early” and “late” cohorts);
- Potential differences in magnitudes or direction of treatment effects across the baseline to endline (2014-2017) and endline to follow-on (2018-2021) time periods; and
- Heterogeneous treatment effects based on population sub-group at baseline.

MAIN EFFECTS: INTENT TO TREAT (ITT)

The ITT approach compares average household impacts from villages across the different treatment groups, irrespective of whether all households in the treatment villages directly participated in the intervention or, in the case of the Land Tenure intervention, received the CLC. The ITT approach measures the impacts to households of being offered the different TGCC components, which were randomly allocated to villages. Because the assignment of treatment was at the village level, ITT impact estimates provide rigorous unbiased estimates of impacts. Under the RCT design, any observed differences in impacts between the treatment and control groups are due to the TGCC intervention, given adherence to planned treatment and sufficient sample size to detect impacts.

The ITT estimation compares each treatment arm to the control group, together with the joint effects of the Land Tenure + Agroforestry treatment to Land Tenure alone, and Agroforestry alone. The model is run on the baseline to follow-on panel household dataset and the following specification is used, consistent with the 2017 endline approach:

$$[1a] \quad Y_{ij} = \beta_0 + \beta_1 T_{ij}AG + \beta_2 T_{ij}LT + \beta_3 T_{ij}AgLT + Y_{ij}0 + u_{ij}$$

⁵¹ As discussed in the sample details section previously, the uneven implementation of the Land Tenure component across chiefdoms during the post-TGCC resulted in the maintenance of all four treatment groups, but substantial sample size imbalance across the treatment arms at follow-on that were aligned with chiefdom.

where Y_{ij} is the outcome measure of household i in village j . T_{ij} is the treatment dummy for each of the three treatment arms of interest (Agroforestry (AG), Land Tenure (LT) and Land Tenure + Agroforestry (AgLT)). Y_{ij0} is the baseline vectors for the outcome measure and u_{ij} are robust standard errors clustered at the village level, using Huber-White sandwiched standard errors (Lin et al., 2013).

The ITT approach estimates impacts from baseline to follow-on using a panel household dataset and ANCOVA model. The estimation is based on the difference in means by treatment status obtained via regression using the follow-on data, while controlling for the baseline value of the outcome to reduce the estimator's (β) variance. This approach estimates the average impacts for households in a given treatment group, relative to the control group, regardless of whether the household received no, partial or full treatment for a given intervention. While treatment was randomly allocated to villages, not all households or potential participants within those villages may choose to take part in the interventions. Impacts therefore measure the effect on households of being offered treatment, rather than the effect of receiving treatment. This is typically considered to be more relevant from policy and programming perspectives because it reflects the actual impacts of programs as they are implemented in practice, rather than as conceptualized.⁵²

The main caveats to this approach for the TGCC IE analysis are:

- It combines (averages) impacts across Land Tenure or Land Tenure + Agroforestry households that received either partial (no CLC) or full (with CLC) Land Tenure services;
- It assumes linearity of treatment effects over time. The model does not allow for a possibility of time-varying treatment effects, as it does not explicitly include an indicator for a time period in the estimated equation. Therefore, it combines (averages) impacts for households that received the Land Tenure component of the intervention either in 2014-2015 or 2018-2019.
- Analysis for Outcome Family 6 (Food Security and Women's empowerment) is run as cross-sectional rather than panel analysis, since no data was collected on these indicators at baseline.

SUPPLEMENTAL ANALYSIS: TREATMENT ON THE TREATED (TOT)

ITT impact estimates are typically considered more policy relevant because the type of selection process observed during the TGCC implementation is what one might expect in any real-life implementation of similar projects. However, because not every household in the treatment villages received the treatment, ITT impact estimates generally are anticipated to be lower than impact estimates that include only the households that actually participated in the intervention and received the CLC document (called the treatment-on-the-treated (TOT) estimate).

The TOT approach is also implemented at follow-on and uses the same general model specification as above. For households in Land Tenure or Land Tenure + Agroforestry treatment groups, the analysis is restricted only to households that received a CLC in addition to the other Land Tenure services (in other words, they received the full Land Tenure treatment as intended). This approach estimates the average impacts for households in these treatment groups that chose to participate in customary land formalization of their household's parcels and were also located in a village and chiefdom where the chief allowed CLCs to be distributed to households and determined the household to be eligible to

⁵² This may be particularly relevant for a program like TGCC, where it was not anticipated at program start that some chiefs would later decide not to support distribution of the CLC to households. From a real-world policy perspective, this may actually be a stronger reflection of likely implementation experiences and the resulting average impacts, where for any given set of chiefdoms in which a similar program is rolled-out in future, there may be some chiefs who ultimately decide not to comply.

receive the document. For the TGCC IE analysis, this approach estimates the average impacts of the Land Tenure or Land Tenure + Agroforestry intervention at follow-on, relative to the control group, for households that obtained a CLC.

The main caveat to this approach for the follow-on IE is that since this estimation is conducted on a subset of data, the estimation sample is smaller and so the statistical power to detect small but true impacts is reduced. For the IE sample at follow-on, dropping households that did not receive the CLC also effectively restricts the sample to primarily two chiefdoms: Maguya and Mkanda.

SUPPLEMENTAL ANALYSIS: CROSS-SECTIONAL ANALYSIS OF EARLY VS LATE LAND TENURE RECIPIENTS

The post-TGCC Land Tenure implementation by ILRG was implemented by the same local partners as TGCC, using consistent approaches and implementation processes. This introduced a phased roll-out for the Land Tenure intervention. At follow-on, villages in the Land Tenure or Land Tenure + Agroforestry arms were now split between “early” and “late” cohorts, based on whether the Land Tenure component was implemented in 2014-2016 under TGCC, or 2018-2019 under ILRG.

The panel ITT analysis at follow-on estimates the average (combined) impact of these two cohorts. However, because this time lag could have led to differences in outcomes for households in the two cohorts, the follow-on IE also conducts supplemental exploratory analysis to examine that. This analysis employs the same general model specification as above, restricts the sample to the three chiefdoms where the post-TGCC follow-on Land Tenure programming was conducted (Mshawa chiefdom is excluded), and reallocates villages to one of four treatment arms: Land Tenure in 2014 (no change to treatment status by follow-on); Land Tenure + Agroforestry in 2014 (no change to treatment status by follow-on); Land Tenure in 2019 (these were control villages during the TGCC era); and Land Tenure + Agroforestry in 2019 (these were Agroforestry only villages during the TGCC era, and received the Land Tenure component during the post-TGCC phase of programming). The LT2019 group serves as the control group for comparison and is omitted from the regression.

The model estimates the impacts for each treatment group relative to the group of villages that did not receive Land Tenure programming until 2019 (and no agroforestry programming at all). The aim of this exploratory analysis is to gain additional insights into whether households from villages that received the TGCC components seven years ago have different maturation of program impacts from those in the later Land Tenure cohort. The main caveat is that the exclusion of Mshawa chiefdom from the analysis results in a smaller estimation sample and so the statistical power to detect small but true impacts is reduced.

SUPPLEMENTAL ANALYSIS: TWO-WAY FIXED EFFECTS (TWFE)

To gain additional insights into the effect of the “phased” Land Tenure treatment assignment that took place by follow-on, and the potential for different magnitudes or direction of treatment effects across the BL-EL and EL-FO time periods, we also employ an interacted two-way fixed effects (TWFE) approach. This approach makes use of a balanced panel of household observations across baseline, endline and follow-on rounds, and interacts time with treatment to estimate the average impact of each treatment group at endline in 2017 and at follow-on in 2021, relative to baseline. This approach more flexibly takes into account the Land Tenure treatment that households in most Control and Agroforestry villages received during the post-TGCC treatment period, and allows us to observe

changes in direction or magnitude of impact that may have occurred during the follow-on period relative to endline. It includes both unit (village) and time fixed effects that account for unobserved potential confounders that are either unit-specific but time invariant, or specific to a given time period but unit-invariant. While this approach allows us to explicitly observe dynamic treatment effects across rounds, if they exist, the main caveat to this approach for the TGCC IE analysis is the assumption of linear additive effects. This analysis is restricted to a balanced panel subset of the data that only includes households that were surveyed in all three survey rounds.

$$[1b] \quad Y_{ijt} = \alpha + \beta_1 LT_{jt} + \beta_2 Ag_{jt} + \beta_3 AgLT_{jt} + \beta_4 J_j + \beta_5 T_t + \epsilon_{ijt}$$

HETEROGENOUS EFFECTS: SUBGROUPS ANALYSIS

The TGCC IE analysis is also concerned with detecting treatment effects among specific subgroups, including female-headed households, poor households, land-constrained households, youth-headed households, and elderly-headed households. To test for heterogeneous treatment effects, the following specification is used:

$$[1c] \quad Y_{ij} = \beta_0 + \beta_1 TijAG + \beta_2 TijLT + \beta_3 TijLT Het_{ij} + \beta_5 TijLT * Het_{ij} + \beta_6 Tij(AgLT) * Het_{ij} + u_{ij}$$

Where Het_{ij} is an indicator for the subgroup of interest and other parameters remain as in [1a]. Power is lower for the subgroup analyses, as the number of respondents per village who fall into a given subgroup is less than the overall number of respondents. The power also varies by subgroup, since the number of households in a given sub-group of interest also varies. The NORC team's scoping work at follow-on found that power range from 0.25 to 0.44 across the five subgroups of interest for the TGCC IE.

Only the youth-headed subgroup analysis, where youth-headed households constituted 53.3 percent of households at baseline, is powered similarly to the full IE. The land-constrained subgroup analysis is particularly underpowered since only 13.6 percent of households at baseline were in that category. As a result, that subgroup analysis is only powered to detect large effects (MDE = 0.441 SD). The subgroups analysis for female-headed households, elderly-headed households and poor households are powered to detect medium effect sizes, ranging from 0.33 to 0.36 SD from the mean (Table 4).

Table 4: Average Minimum Detectable Effect Sizes for Subgroups Analyses

Subgroup	% of HHs in Subgroup	Full Sample MDE (average across outcomes)	Subgroup estimated MDE
Female-Headed	21.8	0.198	0.356
Youth-Headed	53.3	0.198	0.246
Elderly-Headed	26.1	0.198	0.330
Poor	21.0	0.198	0.362
Land Constrained	13.6	0.198	0.441

MULTIPLE TESTING

The 2017 endline used a false discovery rate (FDR) adjustment to p-values from each test conducted, to account for the potential for false positives on impacts given the number of hypothesis tests run within

each outcome family. However, and as the literature also suggests,⁵³ the 2017 endline team considered this correction to be too conservative, particularly since outcomes within each outcome family are often closely related. The 2017 endline therefore relied on the uncorrected p-values. We take a similar approach for follow-on, reporting results that are not adjusted for multiple hypothesis testing.

STRENGTHS AND LIMITATIONS

STRENGTHS

The RCT design and relatively large household and village sample sizes constitute significant strengths for measuring TGCC's impacts, which enhances the robustness and validity of IE findings. The implementation of a third-round of data collection enables the analysis to draw on a panel of households and villages across three time periods. In addition, the mixed-methods qualitative and quantitative approach at follow-on enables triangulation of findings across multiple sources and allows for more substantive interpretation of the statistical impact results, identification of potential causal mechanisms by which observed impacts were achieved, and an understanding of how context factors may have influenced outcomes. It also enables deeper coverage on topics that may not lend themselves as well to quantitative measure, includes several themes related to women's empowerment. Finally, the collection of the follow-on data several years after the conclusion of TGCC's agroforestry and customary land formalization activities provides an unusual opportunity to gain insights into the longer-term impacts and sustainability of such programming for household beneficiaries.

LIMITATIONS AND POTENTIAL SOURCES OF BIAS

Partial treatment of Land Tenure households in some chiefdoms: The partial treatment of households from Land Tenure or Land Tenure + Agroforestry villages in two of the four chiefdoms introduces a constraint for the IE analysis that must be taken into account when interpreting results. The partial treatment is not random and appears to reflect differences in support for the CLCs by chiefs, which in turn could affect household outcomes (for example, if households in such chiefdoms believe their customary leaders are less supportive of their customary land rights, they may have lower perceived tenure security over their fields). At follow-on, however, many households in qualitative villages from these two chiefdoms appeared to believe they would still eventually receive the CLC document.

The IE takes two approaches to mitigate this constraint, consistent with the approach adopted at endline. First, the evaluation results rely on intent-to-treat estimates, which estimate TGCC's average household impacts across all chiefdoms stemming from household engagement in TGCC's participatory land mapping and related land governance activities offered in their village, and their expectation of receiving a CLC. Households in the Land Tenure treatment arms that did not receive a CLC may have weaker impacts than those who did, according to the Theory of Change, and the ITT impact results for the TGCC program as a whole is an average of those differences, if they exist.⁵⁴ Second, the evaluation conducts a supplemental TOT analysis, which provides insights into impacts for the subset of households that did receive the CLC. We anticipate that impacts may be stronger for such households, but the

⁵³ For example see Gelman et al 2012.

⁵⁴ TGCC's experience on this and the ITT impact estimates in the presence of varying treatment fidelity for the Land Tenure intervention are considered more policy relevant in any case, since chiefs in Zambia are not legally required to issue CLCs to their constituents and unanticipated changes in traditional authority's support for the document among some proportion of chiefdoms may be a possibility for future programming as well.

smaller sample size means the analysis has less power to detect true but small effects. The results from this approach should also be treated with some caution because the TOT approach cannot mitigate potential selection biases stemming from households choosing not to participate in the certification process (although this appears to be uncommon), or being deemed ineligible to receive a CLC by chiefs on the basis of their nationality or lack of a National Registration Card.

Sample size imbalances stemming from implementation of the post-TGCC programming in 3 of the 4 chiefdoms:

The implementation of the post-TGCC Land Tenure programming in three of the four chiefdoms poses some challenges for the impact analysis because it results in a smaller than desirable sample size for two of the four treatment arms (Agroforestry only, and Control). The follow-on team conducted several supplemental analyses to provide additional insights into patterns of results and build confidence in the robustness of the direction and magnitude of statistically significant impacts. The team also drew heavily on triangulation from qualitative data to determine whether observed impacts were corroborated through the qualitative findings and, most importantly, whether the qualitative data provided insights and support for viable mechanisms by which such impacts could have been achieved.

The IE analysis at follow-on can maintain internal validity by conducting within-chiefdom analysis, for example restricting the analyses to Mshawa chiefdom only where all 4 treatment arms remained unchanged at follow-on. But, NORC's follow-on scoping confirmed that the sample size in any given chiefdom is too small to obtain a sufficiently powered impact analysis. Moreover, households in Land Tenure villages in Mshawa chiefdom did not receive CLCs, hence key learning questions from the evaluation cannot be addressed through that sample.

Alternatively, the follow-on IE team could have restricted the analyses only to the three chiefdoms that did receive post-TGCC programming. This also substantially changes the evaluation focus and types of learning questions that can be addressed, since the post-TGCC programming results in no Control or Agroforestry only treatment villages in those chiefdoms. Ultimately, the IE team conducted supplemental exploratory analysis on this subset of chiefdoms to provide insights into targeted learning questions stemming from the phased roll-out of the Land Tenure component in the post-TGCC era.

Low statistical power to detect impacts for some of the subgroups analyses: As discussed above, the subgroups analyses for this IE have lower statistical power than the analysis of average household impacts, due to the smaller proportion of households at baseline in some of the subgroups of interest. The analysis of differential impacts for land-constrained households can only detect large program impacts, while the statistical power to detect differential impacts for youth-headed households is on par with that for households overall (the core IE impact analysis).

Lack of baseline data for food security and women's empowerment outcomes: The RCT design makes it possible to add additional outcome variables at the follow-stage to address new learning interests, which is a benefit of the RCT set-up. A new outcome family and set of indicators related to food security and women's empowerment were added at follow-on, given USAID's strong learning interests in this domain. However the IE analysis must rely on a cross-sectional analysis of impacts for these indicators since no baseline data is available. Interpretation must keep this in mind. This is mitigated to some extent by complementary qualitative coverage.

Response bias: The IE team recruited KII and GD participants for follow-on data collection through purposive, homogenous sampling to help ensure data from the most relevant sources available. Of the

respondents who were available, there may be bias in the types of responses they gave because of an expectation that the study team was looking for a certain type of answer. To help mitigate this, the study team rigorously tested its discussion guides and protocols to ensure the absence of leading questions and priming that could skew responses, clearly communicated the study purpose, and employed moderator techniques to ensure respondents felt comfortable discussing openly.

Recall bias: Some topics covered involved respondent recollections of past events, which may be difficult to remember accurately over time. Recall bias may lead to exaggerated negative or positive perceptions of past experiences, depending on aspects that are most remembered over time. To help mitigate this potential, the IE team worked to carefully design the qualitative instruments, ensure appropriate probing, and used triangulation across multiple data sources.

OUTCOME FAMILY I: TENURE SECURITY

This outcome family has 12 indicators. Five of these are primary indicators that are derived from indices that capture household's perceived tenure security overall, over the long-term and short-term, and household's perceived risk of land loss (expropriation) from internal actors in their villages and from external actors. Seven secondary indicators capture household's perceived risk of land loss from each of six different sources (other households in the village, elites, households from neighboring villages, the chief, the village headperson, or from an extended family member), and whether the household experienced a land dispute in the three years prior to survey.

SUMMARY OF KEY FINDINGS

- There is strong statistical and qualitative evidence that the TGCC and post-TGCC Land Tenure activities led to sustained positive impacts on household tenure security over the longer term.
- The regression analyses of impacts show that:
 - Households in villages that received either the Land Tenure or joint Land Tenure + Agroforestry interventions perceived that their fields are more secure from reallocation or land loss from a range of internal and external sources.
 - Depending on index, the magnitude of impact at 2021 follow-on is equal to or larger than impacts on the same measured via the 2017 endline.
 - Households in villages that only received the Agroforestry component of TGCC did not experience significant improvements to their tenure security over the control group average.
- Impact analyses do not find evidence for an impact on the prevalence of reported land disputes, which was low to begin with. Qualitative and descriptive findings suggest households feel TGCC's participatory land mapping, documentation and related land tenure services has helped reduce the potential for land disputes and made it easier to resolve disputes that might occur.
- Results do not provide evidence that households in villages that received the Land Tenure intervention in 2014-2015 under TGCC have significantly different tenure security outcomes than households in villages that received the Land Tenure intervention in 2018-2019 during the post-TGCC era.
- Qualitative findings from follow-on indicate that disputes around land inheritance and related family disputes around land do still occur, but Customary Land Certificates (CLCs) have played an important role in mitigating land disputes between villages and among owners of neighboring parcels. Group discussion participants and household survey respondents strongly felt the CLC could protect them from losing their land against their will.
- Potential concerns at follow-on include:
 - There is a small but persisting concern among some respondents that having a CLC will eventually require landholders to pay a tax on that land to government.
 - There is some confusion about whether it is possible to update the CLCs, and how to do it. Less than half of household survey respondents who had received a CLC said they had enough information about how to make updates to their CLCs.

IMPACT ANALYSIS RESULTS

Table 5 below presents the overall and subgroup impacts of the TGCC interventions at the time of follow-on data collection in 2021.⁵⁵ The results suggest strong evidence for several positive and significant impacts for households on a range of tenure security indicators as a result of the TGCC and ILRG land tenure interventions. This includes a substantial average increase in household perceived tenure security overall, from internal and external actors, and over the short and long term, as indicated by significant increase to tenure security index scores relative to baseline. And, a significant reduction in the household's perceived likelihood of land expropriation from several different sources, including encroachment by households in neighboring villages, threats from extended family members, or reallocation by headpersons, chiefs, and other elites.

The results are relatively robust across the ITT, TOT and TWFE approaches, and also supported by qualitative findings at follow-on. The magnitude of impacts is similar across ITT, TOT and TWFE approaches, but the significance drops out for some of the TOT results due to lower power. The TWFE results additionally suggest that for some of the tenure security indices, average impacts on tenure security are either sustained or in some cases have grown since endline, which provides evidence for sustained tenure security impacts over the longer term.

For the Land Tenure and Land Tenure + Agroforestry treatment groups, results show the combined average ITT impacts for households that received the Land Tenure intervention either in 2014-2016 during TGCC or in 2018-2019 during the post-TGCC era. Exploratory results provide additional insights into programming impacts given the various permutations and unanticipated issues with how the Land Tenure intervention unfolded in practice but should be interpreted with caution due to reasons stated in the Analytic Approach.

Table 5: Summary of Tenure Security Impact Results by Treatment Group, ITT

Impact Indicator	Agro-forestry	Land Tenure	Land Tenure + Agroforestry
Overall index of HH perceived tenure security (P)		0.17	0.17
Index of HH perceived tenure security in short term (next 3 years) (P)		0.18	0.17
Index of HH perceived tenure security over long term (4 or more years) (P)		0.17	0.17
Index of HH perceived tenure security from internal actors (P)		0.18	0.18
Index of HH perceived tenure security from external actors (P)		0.17	0.15
HHs perceived reallocation risk from headperson (S)		-9%	-9%
HHs perceived reallocation risk from chief (S)		-11%	-8%
HHs perceived expropriation risk from other HHs (S)			
HHs perceived expropriation risk from neighboring villages (S)		-9%	-8%
HHs perceived expropriation risk from extended family (S)		-10%	-9%
HHs perceived expropriation risk from elites (S)		-7%	-6%
Experienced at least one dispute on field (P)			

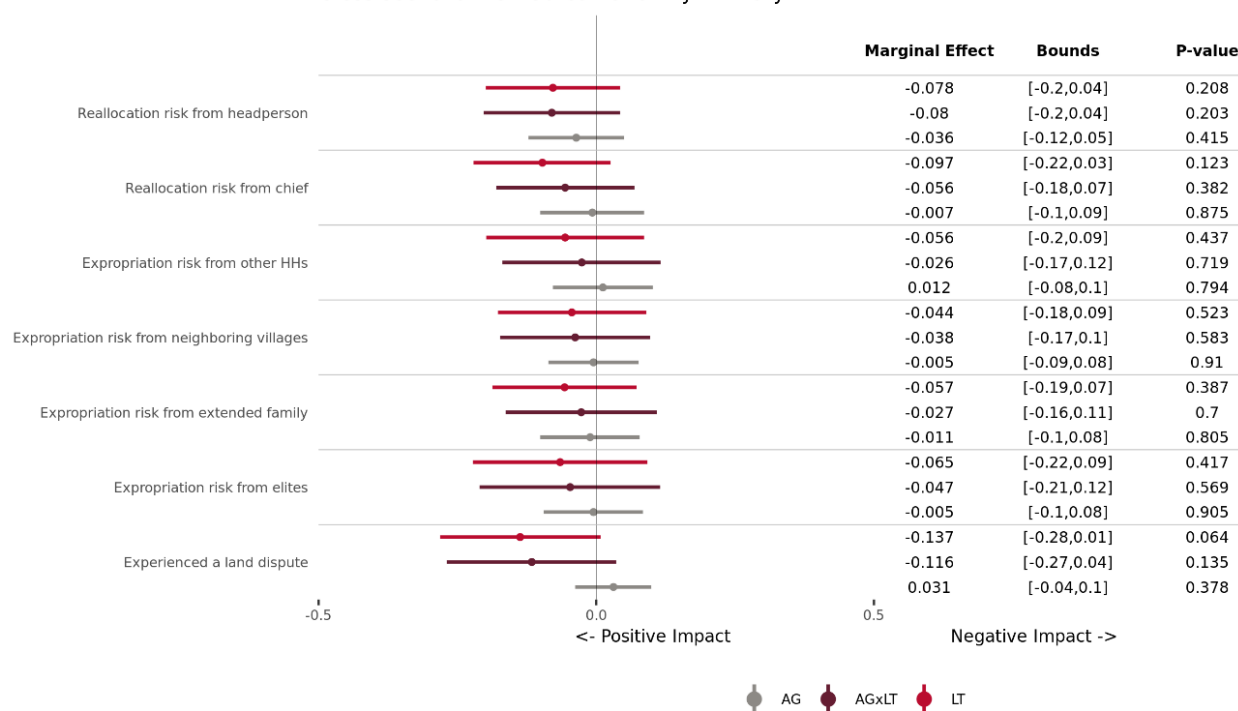
⁵⁵ For all summary impact results tables, empty cells indicate no statistically significant impact on that indicator for the respective treatment group. Where this is a number in a given cell, the number indicates the magnitude of the statistically significant impact and cells are shaded to indicate the level of significant as follows: p < 0.01 p < 0.05 p < 0.10

IMPACT ESTIMATES CHARTS

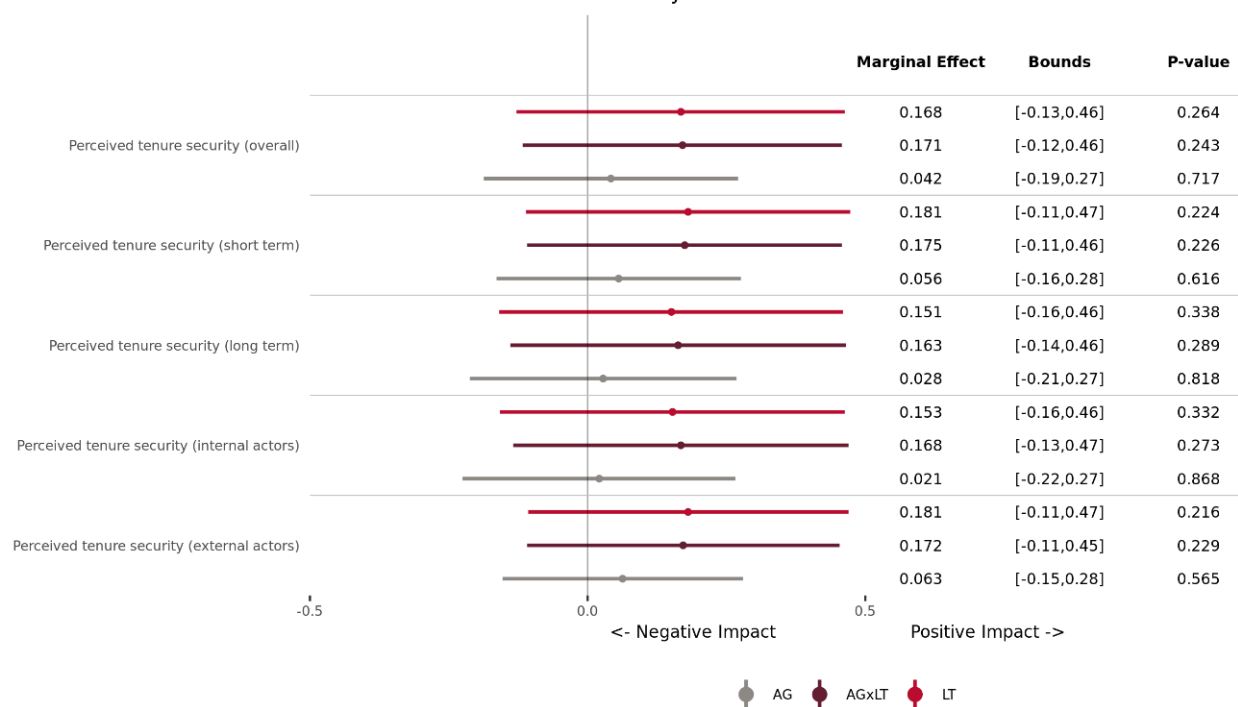
Figure 2: ITT and TOT impact Results⁵⁶



Cross-sectional TOT Outcome Family 1 Binary

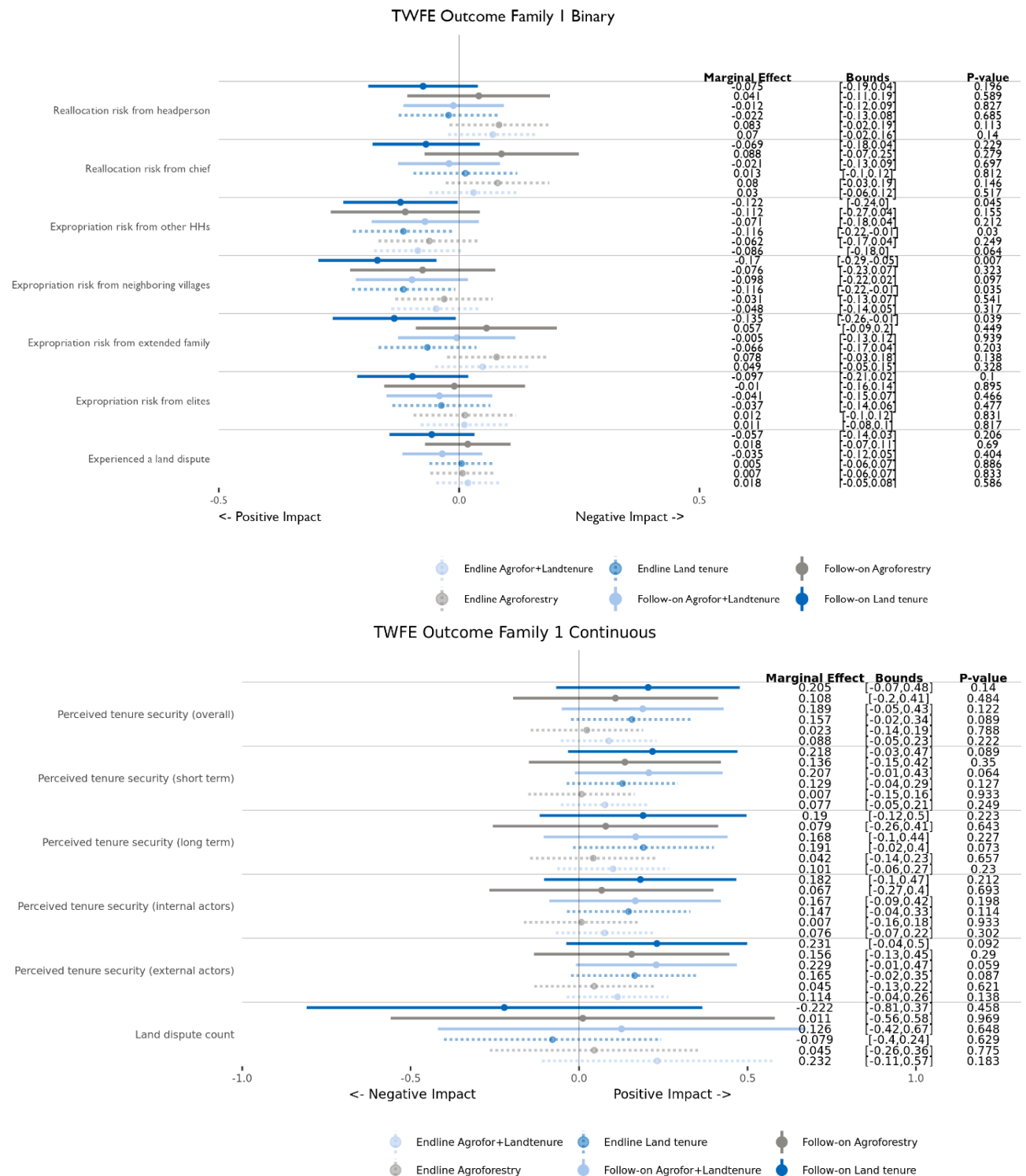


Cross-sectional TOT Outcome Family 1 Continuous



⁵⁶ Chart interpretation for Figure 2 and all impact estimates charts in this report: The point in the middle of each horizontal line represents the point estimate for the effect size for the corresponding outcome variable down the left size of the chart. The horizontal line shows the 95% confidence interval. Where the confidence interval does not cross 0, the result is statistically significant at $p < 0.05$. The three columns on the right provide the point estimate (Marginal Effect), 95% confidence interval (Bounds) and the p -value.

Figure 3: TWFE Model



The ITT regression results at follow-on suggest a sustained positive and statistically significant impact of the TGCC land tenure intervention on perceived tenure security across several indicators. For perceived tenure security indicators, TGCC's land tenure interventions increased the overall index,

together with household's perceived tenure security over the short-term (within the next three years), and over the long-term (four or more years on), by 0.17 points, on average, among households in the Land Tenure and the joint Agroforestry + Land Tenure treatment groups compared to the control group (statistically significant at the 10% significance level). Households in the Land Tenure and joint Agroforestry + Land Tenure treatment groups also perceive that their fields are more secure from reallocation or unauthorized expropriation from both internal and external threats. The magnitude of both effects is 0.18 points over the control group index score of 5.3 (on a scale of 1 to 6), and statistically significant at the 10% significance level.

These results are similar in magnitude and statistical significance to results on the same indicators at the 2017 endline for households in the Land Tenure treatment group, and they represent an increase over the 2017 impacts for households in the joint Agroforestry + Land Tenure treatment group. As such, the follow-on results for these indicators suggest that positive impacts of the TGCC land tenure interventions are being sustained or increasing for households in villages where these interventions were offered.

Examining the household's perceived risk of land loss from six different sources of expropriation that are captured as binary measures, the TGCC land tenure interventions reduced household's perceived likelihood of encroachment or unauthorized expropriation by elites, neighboring villages, chiefs, headman, and family members by 7-11 percentage points on average in the Land tenure treatment group and 6-9 percentage points on average in the Agroforestry + Land Tenure treatment group. These results also suggest sustained (for expropriation risk by headpersons or other households in the village, for households in the Land Tenure treatment group) or newly positive impacts (for other sources of risk and households in the joint Agroforestry + Land Tenure treatment group) in comparison to impacts at 2017 endline. At 2021 follow-on, we do not find evidence for a statistically significant impact on household's perceived likelihood of encroachment or unauthorized expropriation of their land by other households within the same village, although the qualitative findings at follow-on suggest that many households in Land Tenure treatment villages also perceive the CLC to have helped reduce this potential threat.

Consistent with the 2017 endline, the follow-on results do not find evidence for an impact on either the prevalence of land disputes or whether the household experienced any land dispute in the three years prior to survey. The average number of land disputes reported by households was low overall (at baseline, 11 percent of households reported experiencing a land dispute and the average number experienced was 1.4 disputes) and decreased at follow-on compared to baseline in each of the treatment groups (by between 10 and 15 percentage points) and also in the control group (by about 10 percentage points). Hence, we do not find any statistically significant differences between the average dispute counts in the treatment groups and the control group.

The results obtained through the TOT analysis generally support these ITT results above (Figure 2). The point estimates for the TOT results are similar in magnitude to the ITT results, but the confidence intervals are generally wider and several outcomes are no longer statistically significant. The TOT analysis draws on a smaller sample size and has insufficient statistical power to detect statistical significance of effects for the OFI outcomes.

Across all approaches, there is little evidence of marginal improvements to perceived tenure security for households that remained in the Agroforestry only treatment group. Consistent with the 2017 endline, the 2021 follow-on results do not find support for a hypothesis that agroforestry support led to greater perceived tenure security beyond that achieved through the Land Tenure intervention alone.

SUPPLEMENTAL EXPLORATORY ANALYSIS

The exploratory TWFE analysis of dynamic effects across the Baseline to Endline period (2014-2017) and Endline to Follow-on (2018-2021) suggest that positive impacts on tenure security at endline among households in Land Tenure or Land Tenure + Agroforestry treatment groups were sustained or increased during the follow-on period for several indicators (Figure 3). Particularly notable increases in magnitude of impact during the follow-on period were observed for perceived tenure security indices over the short-term, reduced expropriation risk from external actors, and reduced likelihood of encroachment by households from neighboring villages (in these treatment groups, households' perceived risk of this declined by 11.6 percent during endline, on average, and by 17.0 percent during the follow-on period).

Exploratory analyses of differential impacts for households that received the Land Tenure intervention in 2014-2015 relative to 2018-2019 does not find any statistically significant treatment effects for tenure security outcomes. In other words, these results do not provide evidence that households in villages that received the Land Tenure intervention in 2014-2015, under TGCC, have significantly better or worse tenure security outcomes than households in villages that received the Land Tenure intervention in 2018-2019 during the post-TGCC Land Tenure follow-on programming led by CDLA.

SUBGROUPS ANALYSIS

The subgroups regression analyses, which is only powered to detect relatively large effects, did find suggestive evidence for positive impacts for households from Land Tenure or Land Tenure + Agroforestry treatment groups that were **youth-headed** at baseline, on several indices of tenure security. This includes a 0.25 - 0.31 increase in their perceived tenure security index score overall, over the short-term, long-term, and from internal and external sources, relative to non-youth-headed households (moderately statistically significant at $p < 0.10$). Youth-headed households in these two treatment groups also had a 13 percent reduction in perceived likelihood of land loss due to reallocation by the headman or encroachment by members of their extended family (significant at $p < 0.01$).

In contrast, **female-headed** households had a 0.24 - 0.27 decrease, on average, in their perceived tenure security index score overall, over the short-term, long-term, and from internal sources, relative to male-headed households (moderately statistically significant at $p < 0.10$). This represents a 4-5 percent lower index score for female-headed households, although the mean perceived tenure security index score for female heads still remains high at 5.42 (on a scale of 1 to 6).⁵⁷

DISCUSSION

The impact estimate regression analyses provide fairly robust evidence that, on average, the TGCC Land Tenure intervention resulted in positive impacts on household's perceived tenure security that continue

⁵⁷ See additional women's empowerment results and discussion in Outcome Family 6.

to be maintained more than six years after the start of the intervention. In this section, we draw on qualitative data from follow-on and additional descriptive data from household and village leader surveys to explore reasons for these impacts and the potential pathways or mechanisms by which the Land Tenure intervention achieved sustained positive impacts over the longer term. We also discuss variations in tenure security impacts and potential reasons why.

Implementation Context and Treatment Fidelity

Follow-on survey data collection confirmed that the fields controlled by the surveyed households are still overwhelmingly in the customary domain, as they were at baseline (95.9 percent of fields at follow-on (N=4,569) were reported to be under customary tenure). The main mechanisms by which the TGCC interventions aimed to increase tenure security over customary landholdings were through the participatory land mapping and registration process, and also through the issuance of CLCs. In turn, these activities were expected to reduce the frequency and severity of land disputes that households face, and to provide them with proof of their land rights that would protect them from actual land dispossession and lower their perceived risk of losing their land against their will into the future.

In practice, not all households in the Land Tenure treatment group received both of these components of the Land Tenure intervention. While most households in villages that received the Land Tenure treatment had their land mapped, a smaller proportion were issued CLCs, as discussed earlier. At follow-on, 39.9 percent (N=827) of respondents in the Land Tenure or Land Tenure + Agroforestry treatment groups said they had paper documentation for at least one field, and this documentation was a CLC for the vast majority of respondents. This is in contrast to households that had remained in the Agroforestry only or Control treatment groups (i.e., had not received the Land Tenure intervention at all by follow-on), where possession of land documentation was still very low. For households in these two groups, only 4.8 percent (N=18) reported having paper documentation for at least one field. Overall, about half of respondents (52.1%, N=543) who said they participated in certification for a field reported that they had also received a CLC for the field. Out of these households, 82.3% (N=445) were able to show the enumerator the CLC. Another 11.1% (N=60) said their certificate was with another household, 4.8% (n=26) did not know where it was, and 1.8% (N=10) had not yet received it. Of the CLCs that enumerators were shown at follow-on, 95.0 percent (N=423) were rated by the enumerator to be in good condition.

Land Disputes and Dispute Resolution

At follow-on, 21 percent of surveyed households (N=509) said they had experienced a land-related dispute in the three years prior to survey, corresponding to 11.8 percent of fields in the sample (N=571). Of these households, nearly all reported experiencing only one dispute (96.3 percent; N=125). The incidence of land disputes was lower among households that had received any Land Tenure intervention by follow-on, at 20.4 percent (N=422), compared to households that had not, where the incidence was 24.1 percent (N=87). At the field level, the reported disputes were most commonly reported to be about boundary encroachment or disagreements (66.8 percent; N=420), followed by inheritance (19.9 percent; N=125) and land reallocation (7.9 percent; N=50).

Disputes were often resolved quickly, taking place across a couple of days to one week (44.1%; N=173). However, for some respondents they took one month (13.4%; N=52), several weeks (11.8%; N=46), several months to a year (20.9%; N=82), or over two years (9.1%; N=36) to resolve. At the time of the follow-on survey, 231 fields had ongoing disputes. In over half of land dispute incidents (54.5 percent;

N=213), the disputes were first taken to the headman/headwoman to be resolved. Cases were resolved without outside involvement in 18.9 percent (N=74) of cases or taken to the chief or other authorities in 12.0 percent of cases (N=47). CLCs were rarely used in resolving conflicts (used in 5.9% percent of cases; N=23), and the dispute rarely led to violence or destruction of property (2.54 percent; N=16). The majority of respondents (83.8 percent; N=327) stated that they were satisfied or very satisfied with the resolution of the dispute.

FGDs and KIs conducted in villages across the four chiefdoms at follow-on also indicated that the most common types of land disputes that villagers in the TGCC activity area face are around land inheritance issues and related family disputes (familial disputes; 13 of 64 GDs) and encroachment onto fields by neighboring parcel holders or others within the village (intra-village disputes; 15 of 64 GDs). Qualitative findings suggest that CLCs have played an important role in mitigating intra-village land disputes and attempted encroachment onto parcels by people from neighboring villages. However, the CLCs were seen as less useful for mitigating disputes among family and extended family members, because power dynamics within the family may result in the rightful land owner choosing not to or feeling powerless to protect themselves against a competing claim to the land from within the family. Here, several respondents also tied intra-family land and inheritance disputes to entrenched cultural norms and increasing land scarcity as parents continue the practice of sub-dividing their land for allocation among their children.⁵⁸

“You will find that if my field is this way and ends here, someone will come from that end and cultivate in front of me. So those are the land disputes people with land are facing in this village. I am cultivating here, and my field ends here, someone comes and decides to cultivate part of my field.” – Female KI respondent, LT.

Still, villages which had received the Land Tenure intervention, either along or jointly with Agroforestry, were seen to have a better situation than villages which had not received the Land Tenure intervention:

“The problems concern fields and you find that the chief has not mapped the boundaries, so you are just cultivating without knowing the demarcation and eventually end up getting to the other person’s boundary and that results in disputes”. – Female FGD respondent, Control.

Respondents from several villages also mentioned that the CLC mapping and registration process was itself the cause of some land disputes within villages (mentioned in 14 of 64 GDs). In many cases, it was clear that disputes had already existed among parties, but the land formalization work itself had exacerbated or resurfaced old or more protracted disputes over land. In other cases, respondents alleged the mapping work had provided an opportunity for dishonest people to raise claims to land that had not been theirs previously. A common theme from the qualitative data collection at follow-on was the perception that CDLA’s land mapping activities had brought increased division among villagers, at least temporarily, and in several villages bad feelings resulting from those conflicts were still present at follow-on. Land disputes had been present before the TGCC intervention, but villagers said they were accustomed to their internal processes for sorting out those disputes.

⁵⁸ As families grow and the population increases, the practice of subdividing land among one’s children means that smaller portions of land will be available per person with each additional generation unless parents can obtain additional landholdings.

The follow quotes illustrate these themes:

“Mostly the disputes which are there are about demarcations. When Land Aland alliance came to do the mapping, some of the demarcations were wrongly done – they were protruding in other people’s fields. These were bringing conflicts.” – Male FGD respondent, LT.

“The major challenge discovered was that Land Alliance mapped, no problem and assured us, but later on we started to fight amongst ourselves claiming land that it’s that one’s, oh no it’s mine, etc. Yet the land had already been signed for. People start claiming land that is not theirs.” – Male FGD respondent, LT.

“I have a neighbor, he has his land and I have my land. So this neighbor, they left their boundaries and entered my field but when I went there to talk to him, saying you have crossed the boundaries, your field doesn’t reach that far, he answered me that its Land Alliance who gave me that land, they are the one who cut it this way. So on that, now we have a dispute” – Female FGD respondent, LT+Ag

“CLC is of no use because here, ever since LA came some people have disowned each other and they still do not speak to each other, they fight each other and also hurt each other all because of land, so I feel it’s of no use. Instead it has just brought problems... Land Alliance, the mapping of land is what brought all that. Like if I have disputes with this one and later on, I get the CLC, will that CLC be good to me while my friend is complaining?... The problems were there [before], but Land Alliance just made them resurface because it wanted people to own land.” – Female FGD respondent, LT+Ag

“These certificates are good for us, but if it was obtained through corruption, it becomes a problem. There are people here that obtained certificates for the fields that does not belong to them, they got it illegally just because they are related to the chief. To tell the truth these certificates will bring problems some people went diagonally and got the certificate. [And now] They have the certificates.” – Male FGD respondent, LT.

“Those people who got certificates illegally, we have to go back [for them]. But for those who got it in a good [honest] way, we are saying having a certificate is a good thing.” – Male FGD respondent, LT.

Despite these views, ultimately CDLA was recognized to have played an important role in resolving many of the disputes that inevitably arise in the course of customary land mapping and verification.

“Change came when Chipata District Land Alliance came, because before that, others would fight for land which is not theirs. They could seize land which did not belong to their parents, but for fear of black magic, you let go of them. When Chipata District Land Alliance came, they came to resolve that.” – Male FGD respondent, LT.

Respondents highlighted ongoing concerns over village headpersons reallocating their land to someone else in only 3 FGDs, and these were all in Agroforestry or Control villages. This corresponds to household survey data on the same, where only two percent of the survey sample (N=51 respondents) said they had experienced the headperson or chief reallocating land from their household to someone else against their wishes.

“The disputes that we have here is about land, we have land that we have inherited from our parents but when the headman and the higher authority decides to put someone on that land then the conflicts arise.” – Male FGD respondent, AG.

A small number of respondents felt the CLC could not protect them against certain types of land disputes, namely land grabbing by powerful outsiders.

“The worry which is there is what we said earlier. That those who are coming here with money, those are the ones who can grab our land. ... But amongst ourselves in the village, we are not worried because of the Customary Land Certificate which was given to us. But these others from far places who may come and grab our land, we wouldn’t know what to do. Here amongst ourselves, we have the power of the Customary Land Certificate that we have land. Yet, those from far away places with money are [the ones who are] a threat to our land.” – Male FGD respondent, LT+Ag.

Role of CLCs in Increasing Tenure Security: Current and future benefits of CLCs

FGD and KII respondents from Land Tenure treatment villages affirmed that the CLC was important for helping them to protect their land rights. Among those who had received the CLC, there was a general sentiment that the certificate is able to protect them during land disputes, while in many cases the land mapping activities conducted by CDLA and receipt of the CLCs was ultimately seen to have reduced the frequency of land disputes in those villages.

“The Customary Land Certificate has become a dependable document, since the Chipata District Land Alliance introduced the Customary Land Certificate, we have been so happy because in the past we had land disputes more often over the boundaries of our fields and fields of other villages. Since Chipata District Land Alliance introduced the Customary Land Certificate, no one is troubling us, everyone knows his or her field hence we have become more united than before. No one would grab another person’s land; everyone knows his or her land. So, there are no land disputes of any kind.” – Female FGD respondent, LT+Ag.

“In the past when our parents left for us the land. We often times did not agree on land amongst ourselves we could say, “don’t reach this part it is my land, don’t reach that part, it is my land.” We had land disputes. But since the coming of Customary Land Certificates from Chipata District Land Alliance, they have brought us together and there is no challenge of any kind that we are facing this is because everyone knows where his or her land ends.” – Female FGD respondent, LT+Ag.

The CLC was also described as providing “satisfactory proof of ownership,” which villagers saw as especially powerful to protect them from outsiders who might attempt to encroach on their land.

“Yes, even if you go to court now, there are no problems because the certificate will act as witness. Even if someone was to claim the land you just go with that person to the chief and carry the certificate, then the chief will decide by looking at the certificate and I will win the case.” – Male FGD respondent, LT+AG.

“The Certificate can help to protect like my friend has explained, but also it can help us from others like people from the government who may come and say you move out of this land. If I show the CLC they will confirm and be assured that the land is mine.” – Male FGD respondent, LT+Ag.

“No one can remove anyone because all the people in the village took part in the mapping exercise, even parents; the Chief and headman know where everyone’s land boundary is. So, the certificate is like a satisfactory proof of ownership.” – Male FGD respondent, AG.

Among survey respondents who had a CLC at follow-on, the most important benefits that respondents cited they had already obtained were: Reduced likelihood land could be taken from the household against their will (32.7 percent); Fewer boundary disputes (21.2 percent), fewer inheritance disputes (16.6 percent); and reduced likelihood of land be taken from the village (13.9 percent). Four percent said there were no benefits yet obtained from the CLC, while less than one percent felt the document helped them to access credit (0.57 percent), increase their control over agricultural decisions (0.41 percent), or improve their ability to buy or sell land (0.18 percent).

Table 6: Most Important Benefit of CLCs, Now and in Future

Response	Land Tenure or Land Tenure + Agroforestry at Follow-on				Agroforestry or Control at Follow-on			
	Now		Future		Now		Future	
	N	%	N	%	N	%	N	%
Land is less likely to be taken from HH	1591	32.1	1498	28.4	54	40.3	50	33.1
Fewer disputes about boundaries	1060	21.4	1097	20.8	23	17.2	33	21.9
Fewer disputes about inheritance	821	16.6	995	18.9	15	11.2	21	13.9
Land is less likely to be taken from village	702	14.2	900	17.1	15	11.2	18	11.9
Fewer disputes about land allocation	421	8.5	520	9.9	10	7.5	12	7.9
There are no benefits	204	4.1	119	2.3	13	9.7	10	6.6
Other	92	1.9	55	1.0	3	2.2	3	2.0
Gain access to credit	35	0.7	53	1.0	0	0.0	0	0.0
More control over agricultural decisions	21	0.4	23	0.4	1	0.8	3	2.0
Gain ability to buy or sell land	9	0.2	14	0.3	0	0.0	1	0.7

Demand for CLCs among those who did have them was also high. Of the 2,930 fields at follow-on that did not have any kind of paper documentation, respondents said they would like to receive documentation for 88.0% (N = 2,578) of them. The most common reason cited was that the document would reduce the likelihood of losing their land (53.7 percent of fields; N=2,154), followed by strengthened ability for their children to inherit the land (33.1 percent; N=1,328) and protecting investments that have been made on the land (10.7 percent; N=430). While many households were unwilling to pay money to receive documentation (28.8 percent of fields), those who were stated they would pay an average of 85.2 ZMW (USD \$5.41; SD 209.7 ZMW or USD \$13.31).

On the whole, the qualitative data indicates that CLCs are widely perceived as valuable. However, some respondents felt that CLCs will not be sufficient on their own to change traditional and entrenched cultural norms around land allocation and inheritance for women. More commonly, respondents expressed a view that the CLC may be useful in future for preventing outsiders from taking their land, but it may be less likely to help with disputes that relate to issues of inheritance or familial dynamics.

Current and Future Negative Effects of CLCs

The most common negative consequences of TGCC's customary land formalization activities that respondents mentioned in qualitative group discussion was increased disputes over land within villages as a result of the mapping process, or a feeling that some people had been able to take advantage of the formalization process to claim land that did not truly belong to them. In some cases, respondents

appeared to feel that CDLA as outsiders were not always able to accurately determine or resolve some competing land claims, resulting in land allocation decisions that may not have been correct but are now reinforced through the formalization process, or at least did not have full agreement of both parties.⁵⁹

“All that has been said is true, the coming of land alliance was just disturbing us because we randomly got land that wasn’t ours and [although we] showed land alliance [the boundaries], they are visitors who couldn’t argue with us but just mapped according to what we have told them. And this issue [now] has been taken to the chief. You will find that the people who are claiming for land, none of them owns it, they might have gained it through marriage.” – Male FGD respondent, LT.

With respect to potential future negative consequences of the CLCs, respondents from three of 13 FGDs where individuals mentioned challenges with the CLCs highlighted concerns over whether they will be required to pay taxes on their land in future as a result of having the CLC.

“These certificates can be good for now – even when you have conflicts it can work. But we don’t know what will come tomorrow. You find that in future you start [being required to] paying for your field, like what council does. That’s what scares us.” – Male FGD respondent, LT.

Among household survey respondents, 83.0 percent (N= 1,810) reported no negative impacts experienced or anticipated as a result of having the CLC, while 6.8 percent (N=148) reported a concern they would be required to pay taxes or fees on their land. Nearly 6.0 percent (N=94) reported an increase in some type of land dispute.

Table 7: Perceived Negative Consequences of CLCs, Now and in Future.

Response	Now		Future	
	N	%	N	%
There are no negative effects	1809	82.98	1652	75.3
Must pay taxes or fees	148	6.79	249	11.35
Other	73	3.35	66	3.01
Land is more likely to be taken away from me	36	1.65	58	2.64
Increase in disputes about inheritance	35	1.61	42	1.91
Increase in disputes about boundaries	34	1.56	26	1.19
Increase in disputes about land allocation	25	1.15	25	1.14
Traditional authorities lose power and influence	6	0.28	24	1.09
Land is more likely to be taken away from the village	5	0.23	13	0.59
Land is harder to acquire	5	0.23	18	0.82
Corruption will increase	2	0.09	17	0.77

⁵⁹ Respondents from 40 of the 64 GDs conducted said that coming to consensus on correct parcel demarcations was the main challenge they experienced with the mapping exercise. In some villages, respondents felt that Land Alliance initially mapped fields incorrectly, which led to disputes between villagers. In other cases, as the quote here implies, some people may not have recognized a claim as legitimate if the land was accessed through marriage. Other challenges appeared to stem from individuals claiming more land than was actually theirs, which took time and discussion to resolve. As one respondent described: *“It is true what people are saying here, instead of getting their land, they were claiming other people’s land to be theirs and have them mapped. That is the biggest challenge we faced, even those with a small land, you find that they have registered a big land and put people who are not the owner, that’s a problem we had but after seating down we agreed that we should follow the rules the way things were supposed to be. Even if government was to come, no one should claim the land that is not theirs.” – Male FGD respondent, LT+Ag.*

Land Mapping Participation and Benefits within Villages

Participation in the Land Tenure land mapping activities was widely reported by household survey respondents at follow-on. Of the 1,834 households that were from a village that had received the Land Tenure intervention, 58.8 percent (N=1,078) reported participating in village meetings regarding village or household field mapping, 53.5 percent (N=982) participated in boundary walks, 59.5 percent (N=1,091) participated in demarcating their own lands and 39.2 percent (N=719) reported participating in demarcating someone else's land. In addition, 59.8 percent (N=1,095) said they had walked their land boundary with a CDLA member, and 54.5 percent (N = 999) said they had examined a village map and register than had been printed for the village.

Most of the GD and KII respondents from Land Tenure treatment villages felt that households in their village had participated equally in the intervention activities, including women, youth and poorest households. Respondents noted that due to the way the mapping exercise was carried out, everyone who wanted to participate was able to as long as they were present at the time of mapping.

“Land was given to anyone a woman, a man everyone was given a certificate. Land was given to everyone no one was disadvantaged.” – Male FGD respondent, LT, Mkanda chiefdom

“It was equally done unless those who were not in the village at that time. But for all those who were present, they were not choosing. They mapped land for the poor and land for the rich.” – Female FGD respondent, LT+Ag, Mnukwa chiefdom

While all villagers could participate equally in the process, the qualitative data also highlights that not everyone did participate. This appears to have been relatively uncommon, but was widespread in some of the villages visited for qualitative data collection at follow-on and was due to a common set of reasons: (1) individuals were not present in the village at the time of mapping or otherwise occupied; (2) their parents or other household members had their plots mapped together with that of the other household members; (3) they did not feel they had enough information to be confident in the process; or (4) were worried that obtaining a CLC would result in them having to pay taxes on their land.

“The time they were mapping the fields, I was not around. So, the one who participated in land mapping is my biological elder brother and the Customary Land Certificate is with him for the entire field.” – Female KII respondent, LT+AG, Mkanda chiefdom

“Some of us who did not obtain certificates, it was because there was a rumour that we will start paying for the fields. So, we had the doubt that will [have to] start paying [to use] using our own land. Others did not because they were not the real owners of the land, so they feared that if they obtain the certificate, the real owners might come.” - Male FGD respondent, LT+Ag.

There were also some indications that despite equality of participation, women or other disadvantaged groups may not necessarily benefit from the intervention to the same extent in future, but had not yet encountered situations that would allow them to assess this. The quote below illustrates:

“For now, we can say it was equally demarcated from the time land alliance came, and people have peace. But we will see [what happens] when we have problems like divorce – we will see if men will start giving women land after a divorce.” – Male FGD respondent, LT+ Ag, Mnukwa chiefdom

Updating CLCs

Qualitative findings at follow-on highlighted that participants from some villages are not clear on whether it is possible to update their CLCs, and how to do it. In qualitative group discussions, participants from some villages stated the process was clear, noting they would go to the Village Land Committee if they needed to update their certificate, and pay a small fee. Others said they did not know the process. Among household survey respondents, less than half of respondents who had received a CLC said they had enough information about how to make updates to their CLCs.

Responses from headpersons via the Village Leader survey corroborated several issues highlighted above. Headpersons from 67 percent of the villages in sample (N=165) said they had a land register in their village and 64 percent (N=158) said they had a village map. Among villages with either of these, leaders said they had used the land register within 12 months of survey in 35 percent of villages (N=58) and the village map in 30 percent of those villages (N=47) over the same time period.

Per village leaders, CLCs had been distributed to households in 59 of the villages (54 percent of the 110 villages where the headman correctly explained what a CLC is⁶⁰), and those responses largely aligned with expectation based on treatment status and chiefdom. Headpersons from 72 villages (87 percent of headpersons asked this question) said their village had benefited as a result of households participating in land mapping and/or receiving CLCs. Among the same pool of 83 villages, leaders from 10 percent of them (N=8) said their village experienced some negative effects as a result of the participatory land mapping and documentation. At the same time, 99 percent of leaders from those 83 villages (N=82) believed the certification process was useful or very useful for reducing land conflicts in the villages. A similar proportion believed the same with respect to land allocation. Leaders from only two villages thought TGCC's land certification process and CLCs were not useful for land allocation in the village.

⁶⁰ Per endline programming, the survey logic did not ask this question if the village leader could not explain what a CLC was. As a result, this proportion is not available for the full sample. The IE team also verified CLC distribution by village with CDLA.

OUTCOME FAMILY II: LAND GOVERNANCE

The Land Governance outcome family has 12 indicators that focus on household perceptions of various aspects of land-related decision making and land allocation processes in their village, including their beliefs around leader trustworthiness, accountability, fairness and transparency in land-related decisions and land allocation, clarity of land rules and protection of natural resources. This outcome family also looks at whether the TGCC Land Tenure intervention impacted household participation in meetings related to land management, and household perception of whether women, elderly, poor, minority tribe members or other vulnerable groups in their village are disadvantaged as a result of land decisions.

SUMMARY OF KEY FINDINGS

- There is strong evidence at follow-on for significant positive impacts on household perceptions of land governance in their village as a result of the TGCC intervention, for households in villages that received either the Land Tenure or the joint Land Tenure + Agroforestry interventions.
- The regression analyses of impacts suggest that TGCC's Land Tenure component led to:
 - A significant increase in the likelihood that respondents: see their village leader decision-making on land issues as fair and transparent, leaders as trustworthy, and land-related rules are clear.
 - A reduced likelihood that respondents see women, elderly and vulnerable groups in general as disadvantaged as a result of land allocation processes and other land related decisions.
 - The magnitude of impacts are relatively large. Among households that received the Land Tenure intervention, TGCC's Land Tenure intervention led to a:
 - 10 percentage point reduction in the likelihood a household perceived vulnerable groups to be disadvantaged in land decisions, over the control group mean of 46 percent.
 - 10 percentage point increase in the likelihood they believe village leaders make fair decisions about customary land allocation; and
 - 10 percentage point reduction in the likelihood households perceived women to be disadvantaged in land decisions.
- Consistent with the Theory of Change, households in villages that only received TGCC's Agroforestry component did not experience significant positive impacts on land governance outcomes.
- Exploratory regression analysis of dynamic effects for the Baseline to Endline period (2014-2017), and Endline to Follow-on (2018-2021) provide support for sustained impacts over the longer-term for several land governance indicators. But, gains on household participation in land-related meetings and the likelihood that leaders were perceived as accountable were not sustained in the follow-on period.
- Exploratory analyses of differential impacts for households that received the Land Tenure intervention in 2014-2015 relative to 2018-2019 suggests that households which had received any TGCC programming during 2014-2015 had better Land Governance outcomes at follow-on than households in villages that received Land Tenure programming during the 2018-2019 follow-on programming.
- The qualitative findings indicate that TGCC's participatory approach to land mapping, documentation and related services played a role in improved land governance in villages, as did the establishment of Village Land Committees (VLCs). In villages where VLCs are still active, these committees continue to play an important role acting as witnesses for land disputes, consulting parcel demarcation maps for the village that were created by the intervention, and mediating land disputes. Respondents across multiple villages had utilized the VLC by follow-on and reported satisfaction with their capacity to mediate land disputes.

IMPACT ANALYSIS RESULTS

Table 8 below presents the overall and subgroup impacts of the TGCC interventions at the time of follow-on data collection in 2021. As for Outcome Family I above, the results suggest strong evidence at follow-on for significant positive impacts on household perceptions of land governance in their village as a result of the TGCC and ILRG land tenure interventions. This includes significant increases in the likelihood that respondents see their village leader decision-making on land issues as fair and transparent, leaders as trustworthy and consider land-related rules in their village to be clear. The results also suggest that the TGCC and ILRG interventions led to a reduced likelihood that respondents see women, elderly and vulnerable groups in general as disadvantaged as a result of land allocation processes and other land related decisions.

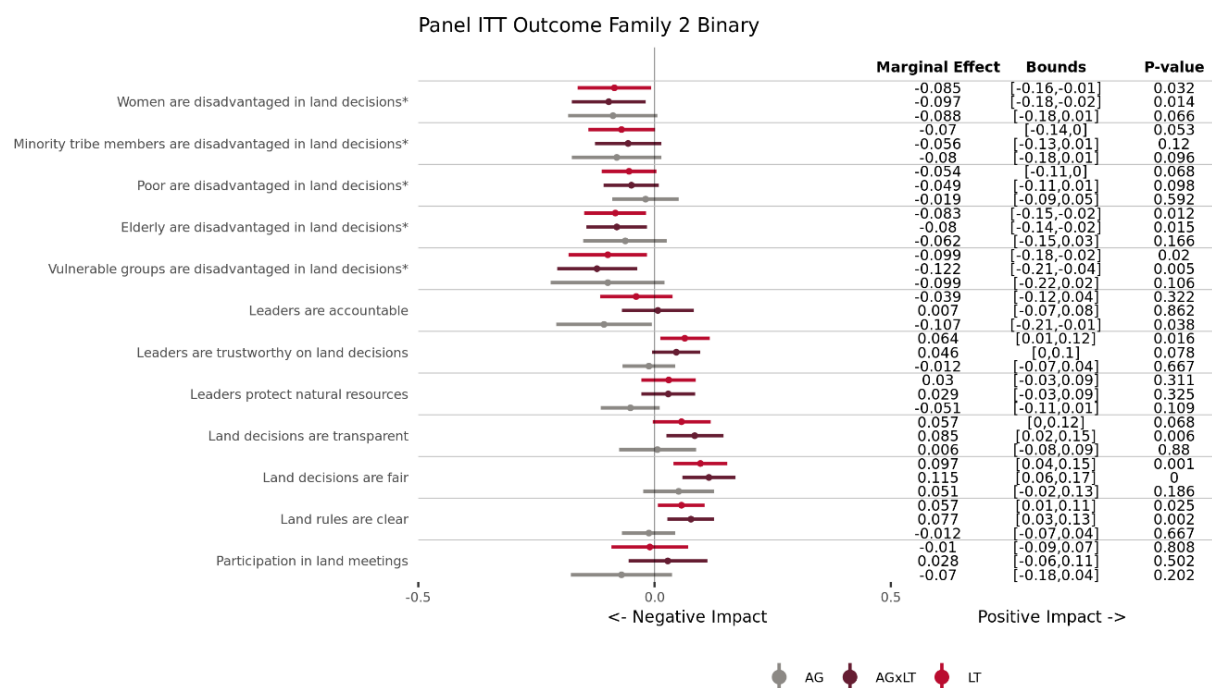
The pattern of results is generally consistent across ITT and TOT approaches, although most of the indicators in the TOT analysis, which has lower power to detect small but true impacts, lose their statistical significance. The TWFE results provide support for sustained impacts over time with respect to perceived improvements for many of the disadvantaged groups assessed (vulnerable groups in general, those from minority tribes, the elderly and the poor), but not for women. In addition, the TWFE results suggest that gains on household participation in land-related meetings and the likelihood that leaders were perceived as accountable were not sustained in the follow-on period.

Table 8: Summary of Land Governance Impact Results by Treatment Group, ITT

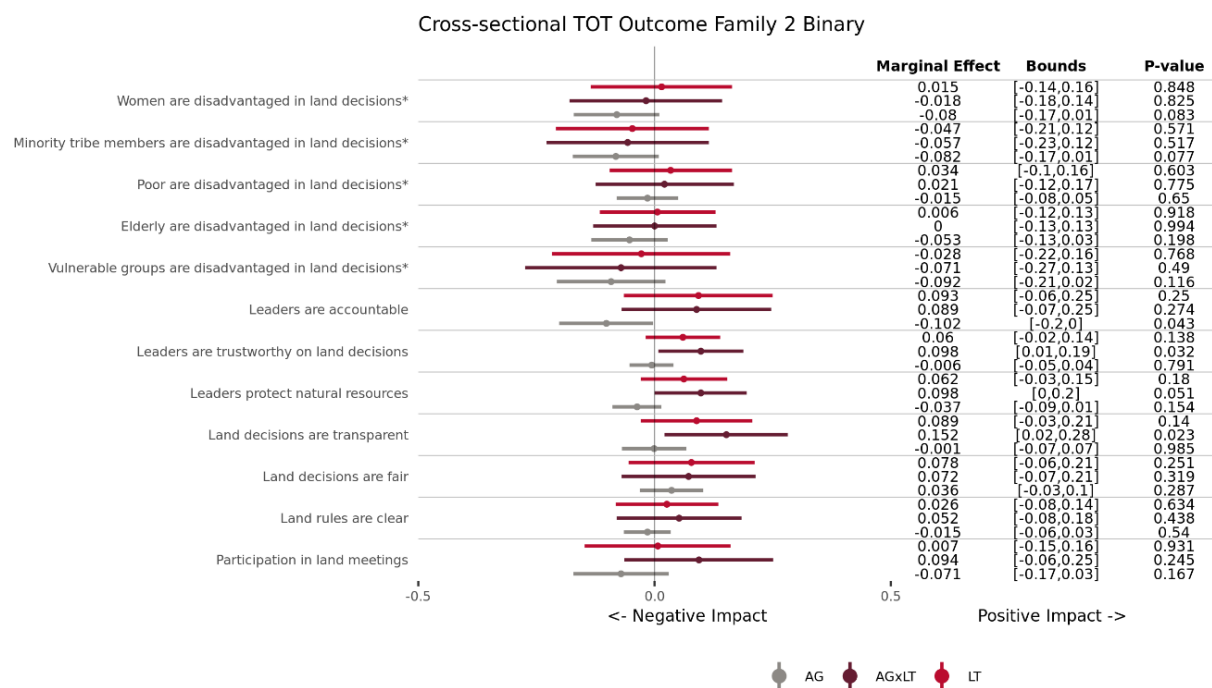
Impact Indicator	Agro-forestry	Land Tenure	Land Tenure + Agroforestry
HH believes leaders are trustworthy (S)		6%	5%
HH believes leaders protect natural resources (S)			
HH believes decisions are fair (S)		10%	12%
HH believes decisions are transparent (S)		6%	9%
HH believes rules are clear (S)		6%	8%
HH believes leaders are accountable (S)	-11%		
HH participation in land management-related meetings (S)			
HH feels women disadvantaged in land allocation decisions (S)	9%	-9%	-1%
HH feels the elderly disadvantaged in land decisions (S)		-8%	-8%
HH feels the poor disadvantaged in land decisions (S)		-5%	-5%
HH feels minority tribe members disadvantaged in land decisions (S)	-8%	-7%	
HH feels vulnerable groups disadvantaged in land decisions (S)		-10%	-12%

IMPACT ESTIMATES CHARTS

Figure 4: ITT and TOT impact Results

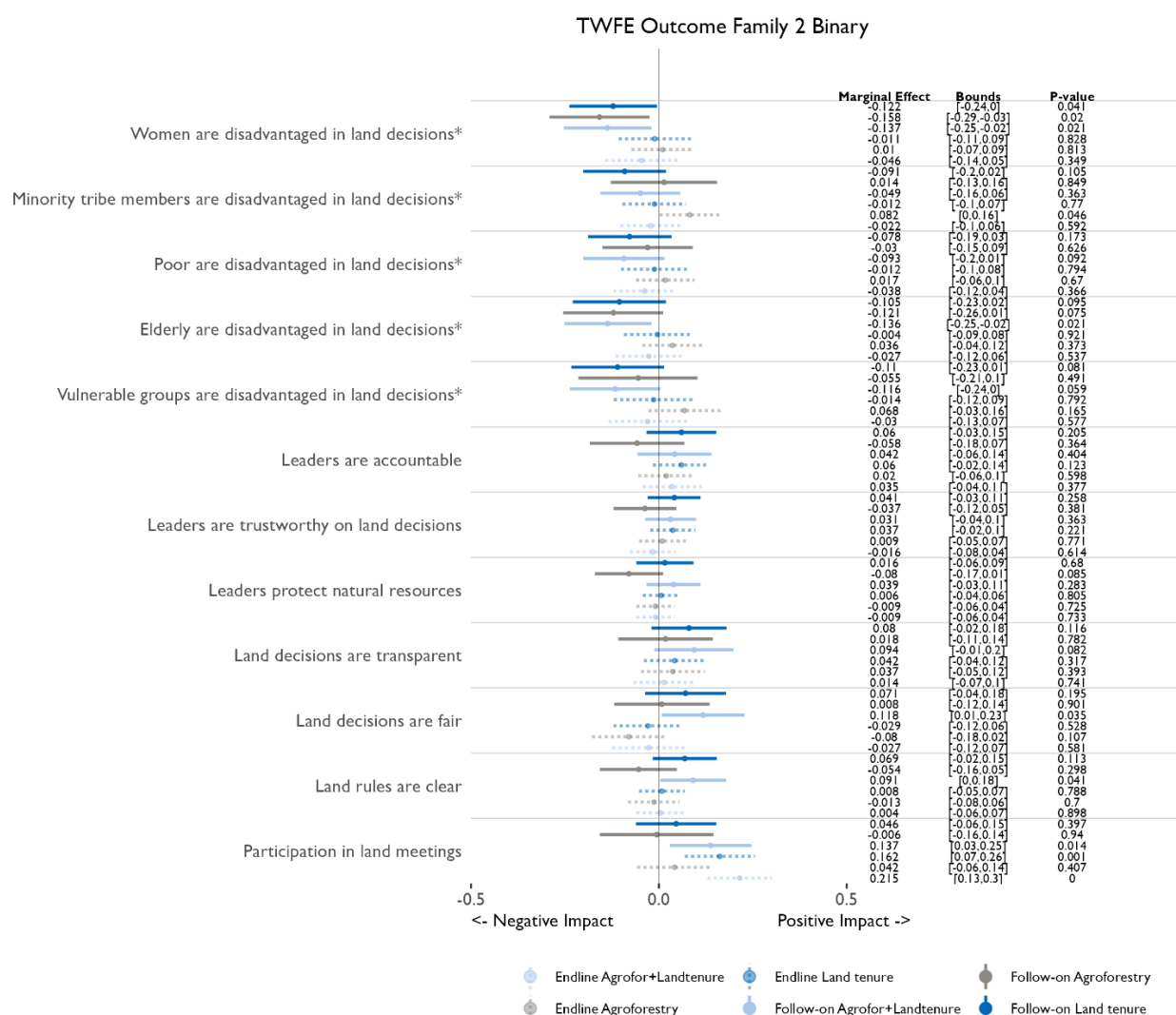


*Note: A negative value for this outcome variable is a positive result, because it indicates a reduction in the perception that this group is disadvantaged in



*Note: A negative value for this outcome variable is a positive result, because it indicates a reduction in the perception that this group is disadvantaged in

Figure 5: TWFE Model



*Note: A negative value for this outcome variable is a positive result, because it indicates a reduction in the perception that this group is disadvantaged in land decisions.

The ITT regression analysis of the Land Governance outcomes⁶¹ suggests that the TGCC Land Tenure interventions have led to an improvement in land governance among households in the Land Tenure and Land Tenure + Agroforestry treatment groups. Several indicators point to an improvement in households' perceptions of local leaders in the Land Tenure and the combined Agroforestry + Land Tenure treatment groups compared to the control group. In comparison to the control group, households in the Land Tenure group and Agroforestry + Land Tenure group are about 5 percentage points (statistically significant at the 10% level) more likely to rate their village leaders as trustworthy with respect to land decisions, on average. Households in the Land Tenure group and Agroforestry +

⁶¹ The follow-on evaluation team dropped two PCA-derived land governance indices for the follow-on analysis, due to insufficient documentation from endline on their construction. These indices were considered primary outcomes in the 2017 EL report. However, since they appear to have been fully derived from the secondary indicators reported on here, dropping these indices does not result in a loss of information for this outcome family. Focusing on the individual governance elements is also more meaningful from an interpretation standpoint. The indices dropped for follow-on are: (1) Overall PCA index of governance and (2) PCA index of HH perception of land leaders.

Land Tenure group are, respectively, 10 and 12 percentage points (statistically significant at the 1% level) more likely to believe that village leaders make fair decisions about customary land allocation, over the control group mean. We also find that households in the Land Tenure group and Agroforestry + Land Tenure group are, respectively, 6 and 9 percentage points (statistically significant at the 10% and 1% levels) more likely to think that village leaders' decisions on the same issue are transparent. Finally, households in the Land Tenure and Agroforestry + Land Tenure groups are, respectively, 6 and 8 percent (statistically significant at the 5% and 1% levels) more likely to believe that rules about land are clear compared to the control group.

We find that TGCC's Land Tenure intervention led to a 10 percentage point (statistically significant at the 5% level) reduction in the likelihood a household perceived vulnerable groups to be disadvantaged in land decisions in the Land Tenure treatment group and a 12 percentage point (statistically significant at the 1% level) reduction over the control mean for households in the joint Agroforestry + Land Tenure treatment group. Given that the control group mean at 2021 follow-on was 46 percent, this represents a relatively large effect in real terms. The point estimate for this outcome in the Agroforestry treatment group is also negative and similar in size but not statistically significant. Looking at specific vulnerable groups, the point estimates include a 5 percentage point reduction in the perception that the poor are disadvantaged in land decisions, an 8 percentage point reduction on the same for members of minority tribes and the elderly, and a 10 percentage point reduction for women, among households in the Land Tenure and Land Tenure + Agroforestry treatment groups (statistically significant at the 10% level).

The TOT analysis does not find systematic statistically significant treatment effects on the land governance outcomes, most likely due to the limited statistical power of this analysis. However, the direction and magnitude of the point estimates obtained from this approach are generally consistent with those obtained via the ITT analysis discussed above, as seen in Figure 4 above.

The 2021 follow-on results for Land Governance outcomes are an improvement over results from the 2017 endline, which did not find statistically significant impacts on Land Governance outcomes for households in either the Land Tenure or Land Tenure + Agroforestry treatment groups at endline (with the exception of a small but significant increase in the proportion of households in the Land Tenure treatment group that believed leaders were trustworthy with respect to land decisions).

Across all approaches, the 2021 follow-on results also provide limited to no evidence for an improved perception of land governance among households that only received the agroforestry intervention under TGCC. This is expected and consistent with the theory of change, which does not envision a mechanism by which the agroforestry intervention alone would lead to improvements in land governance and land allocation decisions among village leaders. This result at follow-on aligns with the 2017 endline, with the exception of outcomes related to the perceived disadvantaged status of various vulnerable groups in land decisions. For those outcomes, the 2021 ITT analysis indicates a reduction in the perceived disadvantaged status of these groups for the Land Tenure and Land Tenure + Agroforestry treatment groups. This is a positive impact and aligned with the broader theory of change. The 2017 endline results on the same found no impact on these outcomes for the LT or LT+Ag treatment groups, and reported a negative impact of TGCC on these outcomes among households in Agroforestry treatment villages.⁶²

⁶² These results from 2017 endline appear to be based on a misinterpretation at endline of the sign of those results, given how the indicators were coded per EL documentation available to our team. For example, a negative sign on the Agroforestry treatment coefficient should be

SUPPLEMENTAL EXPLORATORY ANALYSIS

The exploratory TWFE analysis of dynamic effects across the Baseline to Endline period (2014-2017) and Endline to Follow-on (2018-2021) suggest particular gains were made on land governance indicators among households in the joint Land Tenure + Agroforestry treatment groups during the follow-on period (Figure 5). This was especially so for household belief that land decisions were fair, transparent, and land rules in the village were clear, where gains during the follow-on period were 9 to 12 percentage points each over the endline period (significant at $p < 0.05$). However, these results also indicate that household participation in land-related meetings across both of these treatment groups were significantly higher during the endline period and declined substantially during the follow-on period (significant at $p < 0.01$). The TWFE results also suggest that substantial reductions in the perception that various vulnerable groups are disadvantaged in land decisions took place during the follow-on period, including for women and vulnerable groups in general.

The exploratory analyses of differential impacts for households that received the Land Tenure intervention in 2014-2015 relative to 2018-2019 suggests that households which had received any TGCC programming during 2014-2015 had better outcomes on these indicators at follow-on than those which had served as control households until they received Land Tenure programming during the 2018-2019 follow-on programming. On net, these results suggest the follow-on Land Tenure programming that households received via CDLA in 2018-19 may have been less impactful on these land governance outcomes than the earlier TGCC programming.

Households in villages assigned to receive the Land Tenure treatment earlier (2014-15), those assigned to receive the combined Land Tenure + Agroforestry earlier (2014-15), and those assigned to receive Agroforestry in 2014-15 and Land Tenure in 2018-19 (resulting in them joining the joint Land Tenure + Agroforestry treatment group in 2018-19), have better perceptions of local leaders, on average, compared to households which only received the Land Tenure treatment in 2018-19 during the post-TGCC follow-on programming. Households assigned to receive the early Land Tenure intervention are 7 percentage points (statistically significant at the 5% level) more likely to perceive leaders' decisions as fair, whereas those assigned to the early joint Land Tenure + Agroforestry treatment are 5 percentage points (statistically significant at the 10% level) more likely to have such a perception compared to the late Land Tenure treatment group. Both the early and late joint Land Tenure + Agroforestry treatment groups are about 5 percentage points (statistically significant at the 10% level) more likely to believe that leaders' decisions are transparent compared to the late Land Tenure treatment group. The perceptions that rules are clear are, respectively, 8 and 9 percentage points higher (statistically significant at the 1% level) in the early Land Tenure and the early joint Land Tenure + Agroforestry treatment groups. The belief that leaders are accountable is 11 percentage points (statistically significant at the 5% level) higher in the 2018-19 combined Land Tenure + Agroforestry group.

The exploratory analyses of differential impacts of early versus late assignment to the Land Tenure intervention also reveals that households assigned to the early joint Land Tenure + Agroforestry treatment are 9 percentage points (statistically significant at the 5% level) more likely to participate in land management-related meetings compared to those in the late Land Tenure treatment group. We also detect some improvements in the perceived status of vulnerable groups. The early Land Tenure and

interpreted as a *reduction* in the percentage of households in that treatment group who believe that vulnerable groups are disadvantaged in land decisions. This is an improvement compared to the control group."

joint Land Tenure + Agroforestry treatment groups are 7 percentage points (statistically significant at the 10% level) less likely to feel that vulnerable groups are disadvantaged in land decisions, compared to households that only received the Land Tenure intervention during the 2018-19 post-TGCC follow-on programming. Similarly, households in the early Land Tenure group are 6 percentage points (statistically significant at the 5% level) less likely to think that minority tribe members are disadvantaged in land decisions.

SUBGROUPS

The subgroups regression analysis, which is only powered to detect relatively large effects, found more positive impacts among households from Land Tenure or Land Tenure + Agroforestry treatment groups that were **youth-headed** at baseline for the belief that land decisions are fair and transparent (an 11 to 14 percentage point higher likelihood relative to other households, depending on indicator (significant at $p < 0.001$). There were no other statistically significant subgroups effects for this outcome family.

DISCUSSION

The impact estimate regression analyses provide fairly robust evidence that, on average, the TGCC Land Tenure intervention had resulted in positive impacts on household's perception of land governance in their villages by the time of follow-on. Some of the supplemental exploratory results suggest that many of the gains on this occurred in more recent years, during the post-TGCC era, suggesting that a longer time period after the completion of customary land formalization activities may be required for such impacts to take hold at scale. In this section, we draw on qualitative data from follow-on and additional descriptive data from household and village leader surveys to explore reasons for these impacts and the potential pathways or mechanisms by which the Land Tenure intervention achieved positive land governance impacts. We also discuss variations in land governance impacts and potential reasons why.

TGCC conducted several activities that aimed to increase land governance and accountability in villages that received the Land Tenure intervention. These included the participatory and inclusive nature of the land mapping and CLC issuance activities, but also providing training and awareness raising on customary land laws and rights and establishing Village Land Committees (VLCs) within each community. The qualitative findings indicate that the participatory approach to land mapping and registration played a role in improved land governance in villages, as did the establishment of VLCs.

VLC Establishment and Activity

At follow-on 40.3 percent (N=991) of surveyed households overall reported that their village had a VLC and another 10.3 percent (N=253) reported that their village used to have a VLC but it is no longer active. Among the 2,183 households from villages that had received any of the Land Tenure interventions by follow-on, the percentage that reported having a still-active VLC was slightly higher, at 44.3 percent (N=925). Active VLCs were reported by a greater proportion of households from villages that received any of the Land Tenure interventions during the TGCC era in 2014-2017 (52.3 percent of households, N=661) compared to those that had first received any of the Land Tenure interventions during the post-TGCC era (31.4 percent; N = 264).

The household survey data on this largely aligns with information on the same provided by village leaders. Among village leaders, half of them (N=124) said their village had a VLC at the time of follow-on

survey. All but three of these VLCs had been formed in 2019 or earlier. Among leaders who said their village had a VLC, 52 percent (N=43) said the VLC was equally or more active currently compared to when it was initially established, 46 percent said the VLC is currently less active than when it was first established, and 19 percent (N=24) said the VLC had dissolved and was completely inactive.

Across villages that had ever had a VLC, village leaders overwhelmingly indicated that VLC members had been elected or chosen by the village as a whole (87 percent, N=150). The remainder said members had been appointed by village leadership, CDLA, or had volunteered for the position. Village leaders said that VLCs had 8 members, on average, and on average 3 of the members were women (although women comprised 4-10 members for half of the villages in the sample, according to village leaders).

Qualitative data collection at follow-on indicates that in villages where VLCs are still active, these committees play an important role acting as witnesses for land disputes, consulting the parcel demarcation maps for the village that were created by the intervention, and mediating the disputes. KII and FGD respondents described their role as the first step in the dispute resolution process at the village level. If the VLC cannot successfully mediate a dispute, the case is moved to the headman, followed by the chief.

Respondents from multiple FGDs at follow-on described having utilized their VLC and reported satisfaction with their capacity to mediate land disputes. Respondents highlighted that the VLC members were villagers chosen by the community, which also strengthened their confidence and trust in the committee to arbitrate fairly.

“If a farmer and his fellow farmer has disputes, the committee will come in to resolve the dispute. They will seat them down together with the headman and talk things out. If they are not satisfied, they take it to the chief.” – Male FGD respondent, LT, Mkanda chiefdom.

“If something happens, the village land committee is in the forefront before anything reaches the headman or the chief. So, disputes are resolved by the village land committees. If it fails, that is when the matter is referred to headman.” – Female FGD respondent, LT+Ag.

Active VLCs were noted in 9 of the 32 villages of qualitative data collection at follow-on. In some other villages, respondents said they were unclear on the purpose of the VLCs or were dissatisfied with the committee because they are no longer active or villagers had not been able to work with them when land disputes arise. In those cases, the VLCs appeared to be dormant or had never really been functional from the time of formation.

In 10 of the villages where qualitative FGDs and KIIs were held at follow-on, participants asked for additional trainings or other forms of support for VLCs so that they could become more active and effective. In 7 villages, FGDs participants also mentioned that phones which CDLA provided to VLCs no longer work or have been lost, and VLC members no longer have a way to effectively communicate with CDLA for assistance or support when they need it. Requests for transport assistance were made in three of the villages, so that VLC members could visit CDLA to ask for help or get clarification on a given issue, while in one village FGD participants advocated for payments to VLC members to compensate them for their time doing the committee work.

“This committee [the VLC], according to their procedures when they finished giving out certificates, this committee disappeared and stopped showing up to people. Till now its existence cannot be identified. – Male FGD respondent, LT.

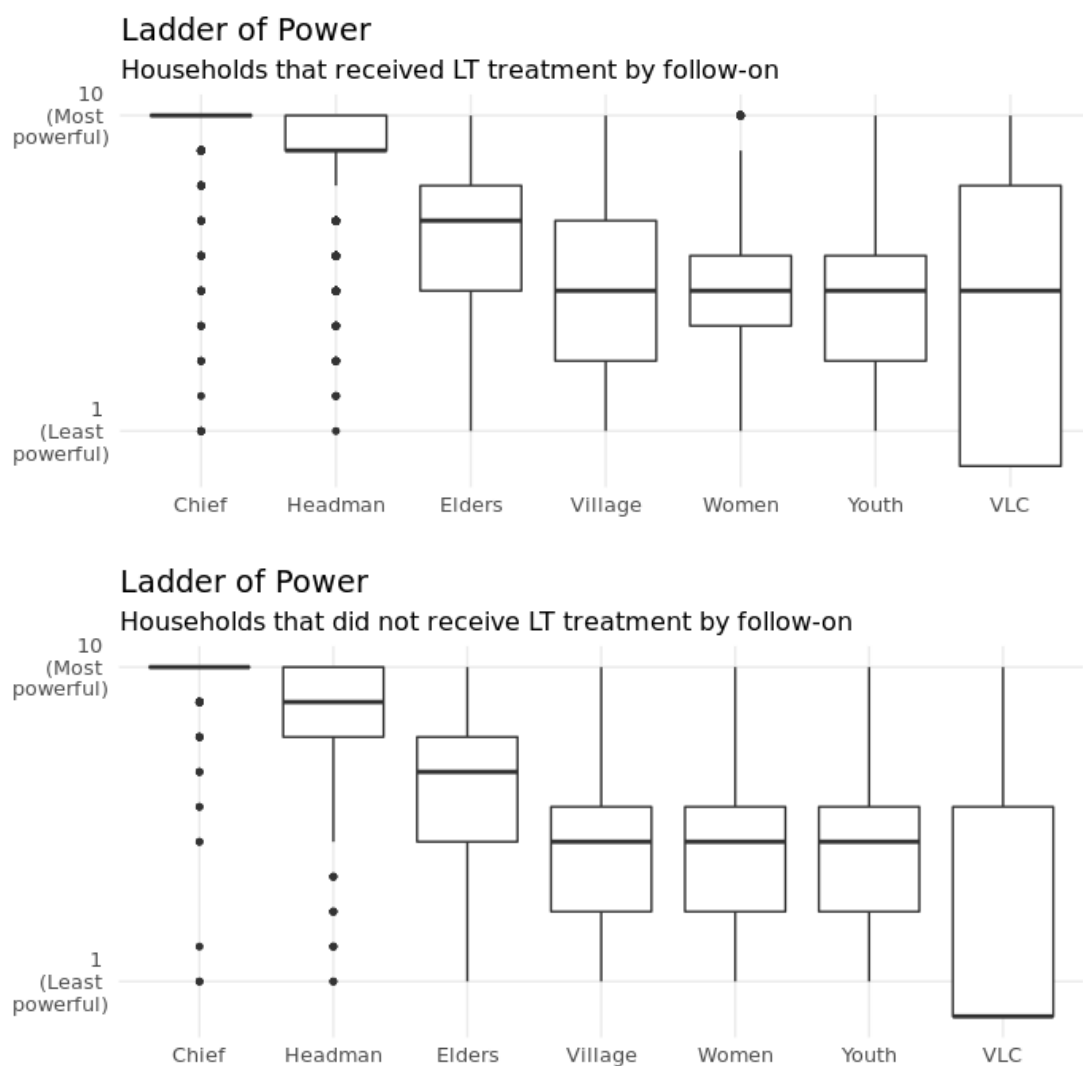
“They formed that group [the VLC]. But since that time, we are unable to see the work that they are doing or the duties that they were appointed for in this village. But, the group is there and exists, and it was chosen.” – Female FGD respondent, LT+Ag.

“How are they [VLCs] supposed to do those things [their roles]? They were chosen, but they didn’t have trainings of any kind.” – Female FGD respondent, LT.

“For this committee to survive it will need communication. The phones that they [CDLA] left us are old, because a phone cannot stay for 5 years without being damaged. Communication is needed and also transport. Just in case something happens, we use it to go to Mshawa on a bicycle.” – Male FGD respondent, LT+Ag, Mshawa.

The 2017 endline IE also assessed potential changes in land governance by examining survey respondent rankings of various community actors with respect to how much power they had over land management decisions in the community. Uniformly, the chief was ranked highest, followed by the headperson and village elders, and there were no differences by treatment arm. There were no material differences to these patterns at follow-on as well (Figure 6).

Figure 6: Ladder of Power at Follow-on, for households in villages that had received Land Tenure Intervention or not



OUTCOME FAMILY III: AGROFORESTRY UPTAKE AND OTHER CLIMATE SMART AGRICULTURAL PRACTICES

Outcome family three consists of eight indicators of climate smart agricultural (CSA) practices or field investments that are deemed beneficial for agricultural productivity, and agroforestry uptake. These indicators include whether the household has constructed planting basins, practiced zero tillage, practiced ridging, applied manure or compost, used fertilizer or practiced crop rotation on any of their fields. This outcome family also assesses whether TGCC's interventions have led to an increase in household use of fallowing, the number of seasons a household left any field fallow in the three years prior to survey, and whether the household engaged in agroforestry on any of their fields.

SUMMARY OF KEY FINDINGS

- At follow-on, there is a large and positive impact on agroforestry uptake among households in villages that received the TGCC joint Land Tenure + Agroforestry interventions. Regression analysis of impacts suggest that TGCC led to a 15 percentage point increase, on average, in the likelihood a household engaged in agroforestry as a result of the combined TGCC intervention.
- The impact analysis does not find evidence for a positive impact on agroforestry uptake among households in villages that only received the Land Tenure intervention, or only received the Agroforestry intervention.
- There is little evidence for impacts of TGCC on household use the other CSA practices that were assessed, including zero tillage, planting basins, composting on fields, or practicing crop rotation. Most of these practices were already common at baseline.
- Exploratory regression analysis of dynamic effects for the Baseline to Endline period (2014-2017), and Endline to Follow-on (2018-2021) suggest sustained agroforestry uptake during the follow-on period among the joint Land Tenure + Agroforestry households.
- The regression results are supported by qualitative findings and descriptive summary statistics from the household survey sample at follow-on. Key findings include:
 - Qualitative evidence from over 40 FGDs strongly suggested that many respondents feel having a CLC makes them more likely to plant agroforestry trees. Respondents directly tied land mapping and receipt of CLCs to their increased interest in undertaking agroforestry.
 - Some respondents said land mapping or receiving a CLC had enabled them to change their farming practices in other positive ways. Many highlighted that because they had more confidence about the boundaries of their fields, they were able to farm all the way to the edge of the field, effectively increasing the area under cultivation.
 - The year of agroforestry tree nursery establishment reported in villages was roughly split between TGCC interventions years (2014-2017) and the post-TGCC era (2018-2021), as were the years households said that had planted agroforestry trees.
 - Gliricidia was more commonly planted than Musangu, and many respondents had a better experience with Gliricidia. More than 85 percent of respondents who had planted agroforestry species said they had obtained the seeds or seedlings from COMACO.
 - Benefits from agroforestry have typically not been sufficient to significantly reduce farmer's reliance on synthetic fertilizers. Moreover, increases in the price of fertilizer had negated their ability to realize increased profits even if their yields had increased.
 - Where FGD participants did say the CLC had helped them to make additional investments, more commonly they had invested in livestock (goats, cattle), plows, water pumps, or fencing, relative to the types of investments and agricultural practices assessed through the IE.

There is little evidence at 2021 follow-on for impacts of TGCC on most of the CSA field investments and good agricultural practices assessed for this outcome family, however there is a large impact on agroforestry uptake among households in the Land Tenure + Agroforestry treatment group (Table 9). The result is robust across ITT and TWFE approaches and suggests strong evidence that households that received both Land Tenure and Agroforestry programming were more likely to engage in agroforestry on at least one of their fields as a result of the TGCC activities. This pattern of result is also reflected in the TOT analysis but does not retain statistical significance.⁶³

The TWFE results provide more nuanced insights into the trajectory of results across endline and follow-on periods. With respect to agroforestry uptake, those results suggest increasing magnitudes of uptake across the endline and follow-on periods for households in the Land Tenure + Agroforestry treatment group, and also suggest there is no evidence for impacts of the Land Tenure intervention alone on agroforestry uptake.

Table 9: Summary of Agricultural and Agroforestry Impact Results by Treatment Group, ITT

Impact Indicator	Agro-forestry	Land Tenure	Land Tenure + Agroforestry
HH practiced zero tillage on field (S)			
HH practiced ridging on field (S)		10%	11%
HH constructed planting basins in field (S)		-7%	
HH applied manure or compost on field (S)			
HH used fertilizer on field (S)			
HH engages in fallowing (Y/N) (S)	-7%	-5%	-6%
HH used crop rotation on field (S)			
HH engaged in agroforestry on at least one field (S)			15%
Number of seasons HH left field fallow (S)			

⁶³ The TOT approach has lower power to detect small but true impacts.

IMPACT ESTIMATES CHARTS

Figure 7: ITT and TOT impact Results

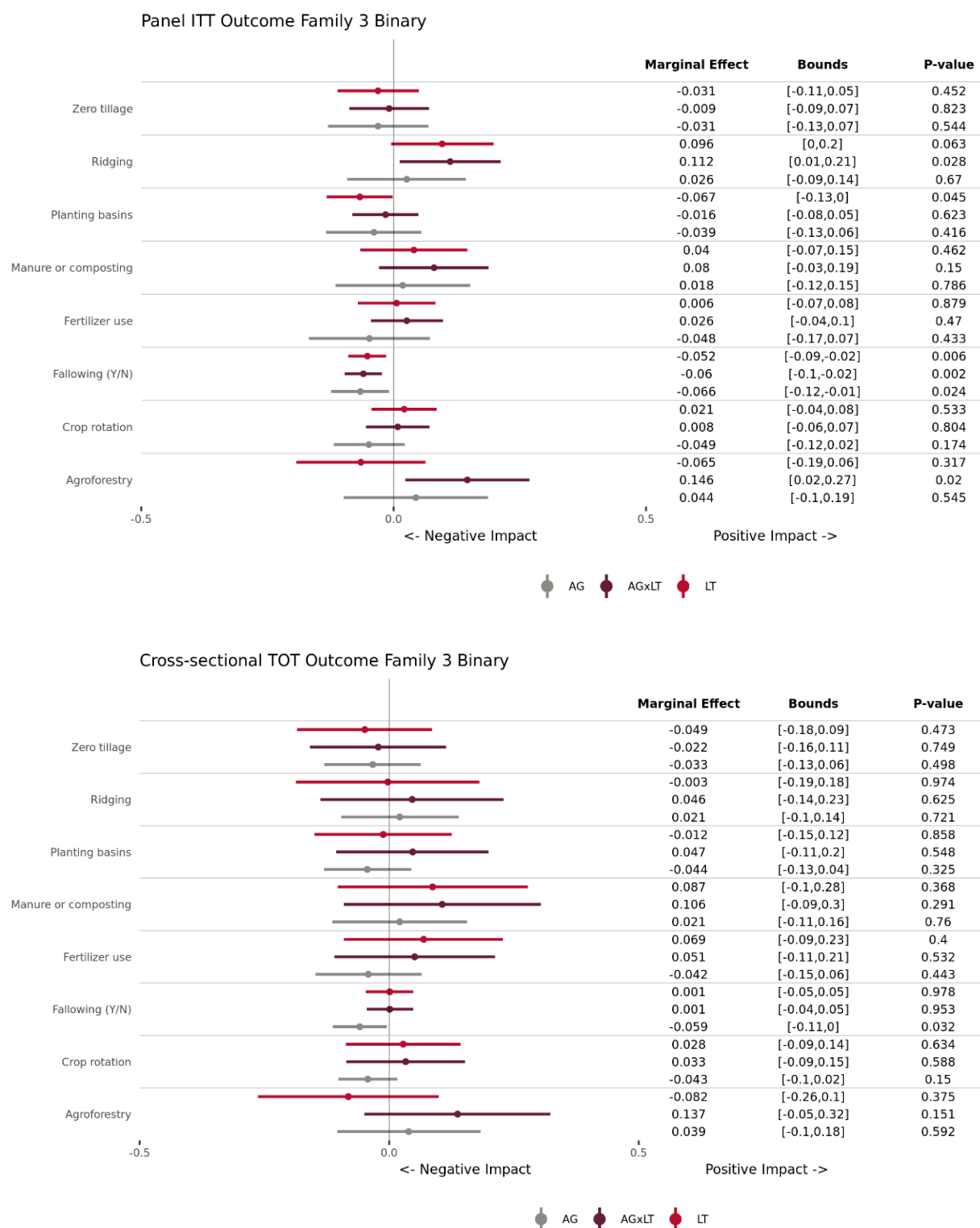
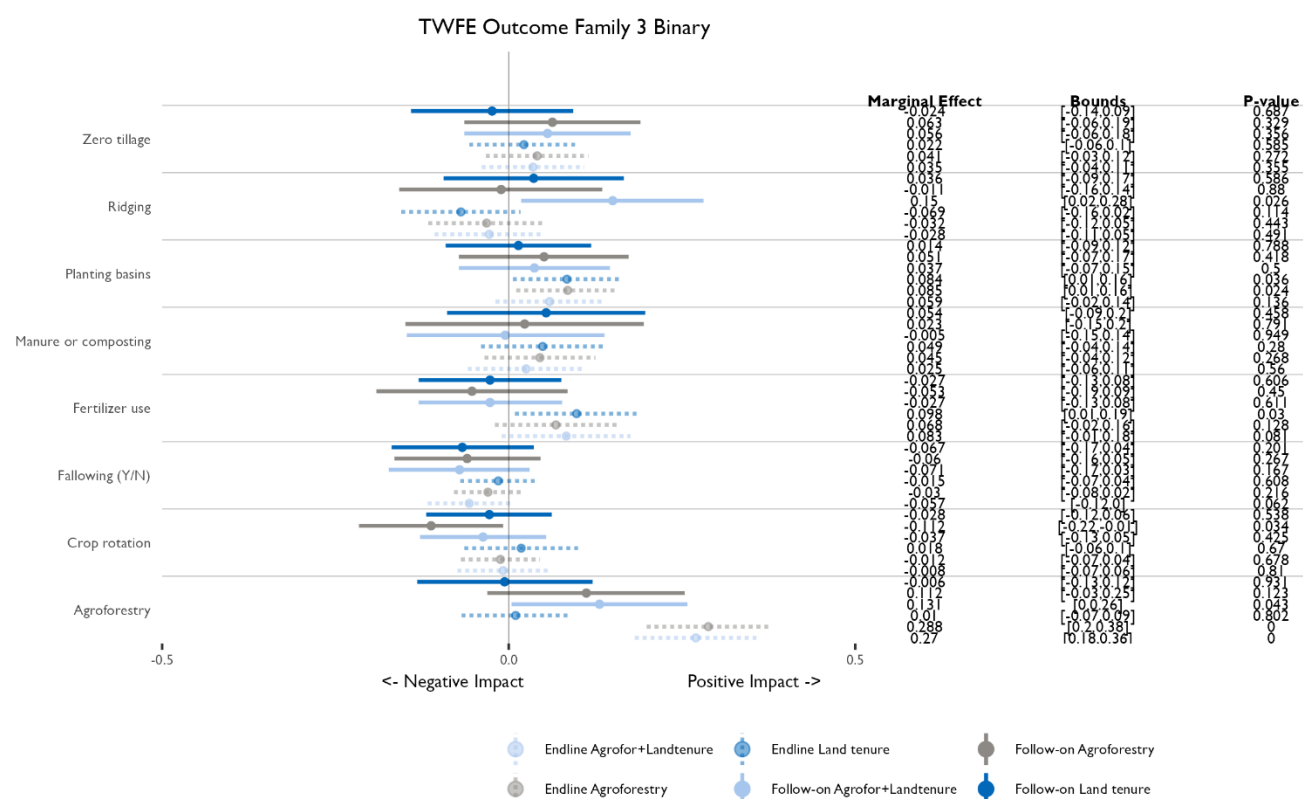


Figure 8: TWFE Model



The ITT regression results are mixed at follow-on for the CSA practices, but strongly positive for agroforestry uptake, which was the primary CSA focus of the TGCC Agroforestry intervention. At follow-on, we find a 15 percentage point increase (statistically significant at the 5% level) in the share of households in the combined Land Tenure + Agroforestry treatment group that engaged in agroforestry on at least one field, compared to the control group share of 43 percent. This positive impact is new for the 2021 follow-on round.

For fallowing, no statistically significant effects are found for any of the treatments on the minimum number of seasons a household left a field fallow, but the point estimates are negative for all treatment groups. When looking at the binary outcome indicator for fallowing, we do find statistically significant (at up to the 5% level) negative effects of around 5-7 percentage points for all treatments groups. The result suggests that households in villages that received any of the Land Tenure, Agroforestry, or Agroforestry + Land Tenure interventions during 2014-2015 are somewhat less likely to leave their fields fallow at follow-on compared to the control group that received no TGCC interventions during 2014-15, where the share of households that reported fallowing was 13 percent. The ITT analysis indicates that households in the Land Tenure treatment group are 7 percentage points less likely to construct planting basins in fields compared to households in the control group (statistically significant at the 5% level). At the same time, the Land Tenure treatment group and the joint Agroforestry + Land Tenure group are about 10 percentage points more likely to practice ridging (statistically significant at up to the 10% level). No statistically significant treatment effects are found for probabilities of using manure, practicing crop rotation, and applying fertilizer.

The TOT analysis does not find systematic statistically significant treatment effects on outcomes related to agroforestry practices, although point estimates are generally of the same direction and size as those based on the ITT estimation (Figure 7). This lack of statistical significance is most likely because of the limited statistical power of the TOT analysis due to small sample size. The only statistically significant treatment coefficient is found for the indicator on fallowing, suggesting that the share of households that practiced fallowing in the Agroforestry treatment group declined by 6 percentage points (statistically significant at the 5% level). This estimate is very similar to that obtained via the ITT analysis.

Comparing the follow-on results for CSA practices to those reported at endline, we confirm a negative effect of the Land Tenure treatment on probability of fallowing for both rounds. However, we also find similar effects for the Agroforestry treatment and the joint Land Tenure + Agroforestry treatment, which were not found at the 2017 endline. The increased use of ridging at follow-on among households in the Land Tenure treatment group and the joint Land Tenure + Agroforestry treatment was also not reported at 2017 endline, together with a decrease in the probability of constructing planting basins in the Land Tenure treatment group.

SUPPLEMENTAL EXPLORATORY ANALYSIS

The exploratory TWFE analysis of dynamic effects across the Baseline to Endline period (2014-2017) and Endline to Follow-on (2018-2021) suggest positive impacts on agroforestry uptake among Agroforestry and joint Land Tenure + Agroforestry treatment groups over both time periods (Figure 8). This includes a sustained 13 percentage point increase in the share of households that engaged in agroforestry during the follow-on period among the joint Land Tenure + Agroforestry households (significant at $p < 0.05$).

The exploratory analyses of differential impacts for households that received the Land Tenure intervention in 2014-2015 in comparison to 2018-2019 suggests an impressive increase of around 27 percent (statistically significant at the 1% level) in the probability that households engaged in agroforestry on at least one field among households in both the early (2014-15) and late (2018-19) joint Land Tenure + Agroforestry treatment groups, compared to households in villages that did not receive the Land Tenure intervention until 2018-19 via CDLA (and no TGCC programming during TGCC implementation years). This 27 percent increase in the probability of agroforestry uptake is large given that the prevalence of agroforestry in the late (2018-19) Land Tenure treatment group, which served as a comparison group in this analysis, was also relatively high at 34 percent.

We find a decrease of 2.7 seasons (statistically significant at the 5% level) in the minimum number of seasons that households left a field fallow in the early Land Tenure group, on average. This suggests that households in villages that received the Land Tenure intervention in 2014-15 are using their fields more intensely relative to those from villages that received Land Tenure services more recently (in 2018-19).

We also find that households in villages which received the joint Land Tenure + Agroforestry treatment in 2014-2015 have an increase in the probability of constructing planting basins in fields of 9 percent, on average, (statistically significant at the 5% level), whereas households in villages that received the late joint Land Tenure + Agroforestry treatment have an increased probability of applying manure by 10 percent and fertilizers by 8 percent (both effects are statistically significant at the 5% level). The probability of households practicing zero tillage is about 8 percent lower in the early Land Tenure and late combined Land Tenure + Agroforestry treatment groups (statistically significant at the 1% level).

SUBGROUPS

The subgroups regression analyses, which is only powered to detect relatively large effects, does not find evidence for heterogeneous treatment effects on the agroforestry and CSA field investments indicators, across any of the subgroups analyzed.

DISCUSSION

In this section, we draw on qualitative data from follow-on and additional descriptive data from household and village leader surveys to explore reasons for these impacts and the potential pathways or mechanisms. We begin with a discussion on the lack of impacts for most of the CSA and related field investment outcomes, and then turn to potential reasons for how the combined Land Tenure and Agroforestry TGCC interventions may have achieved positive impacts on agroforestry.

Non-Agroforestry CSA Field Investments

The lack of significant impacts at follow-on for most of the CSA field investments, barring agroforestry, is consistent with findings at 2017 endline and also supported by qualitative findings and descriptive summary statistics at follow-on. Findings suggest that participatory land mapping or CLC possession had little bearing on whether farmers decided to engage in the types of CSA practices or other field investments focused on for this IE. Moreover, for 97.7 percent of fields at follow-on that had no land documentation (N=2,848), household survey respondents said that a lack of formal land documentation did not discourage them from making improvements on their fields.

High fertilizer prices were cited as a key reason why having CLCs did not lead to increased field investments for beneficiaries. Respondents in several villages described being squeezed between a range of limiting factors, and particularly fertilizer costs, so that even if their tenure security and harvests had increased as a result of the TGCC intervention, this has not translated to higher incomes or motivated making additional investments on fields due to the increased cost of other necessary inputs.

“Since we got the CLC, we never had fertilizer. For irrigation we are still water using watering cans. When we used to do farming ordinarily, we were using watering cans. After Land Alliance came, we are still using watering cans. We have not picked up, so we do not even know where we are heading to.” – Female FGD respondent, LT, Maguya chiefdom.

In FGDs where respondents did say the CLC had helped them to make additional investments, the types of investments they said they made were more commonly around livestock (goats, cattle), plows, water pumps, or fencing. In other cases, beneficiaries made it clear that if they had additional income to spend, agricultural investments were often not their first choice, given the rising price of inputs and their level of household poverty. Some respondents said they invested (or would prefer to invest) in iron roofs for their houses, sleeping on blankets instead of reed mats, or upgrading their mud-walled houses to brick.

However, some respondents said land mapping or receiving a CLC had enabled them to change their farming practices in other positive ways. Many highlighted that because they had more confidence about the boundaries of their fields, they were able to farm all the way to the edge of the field, effectively increasing the area under cultivation. Before the intervention, they worried about conflict with neighbors and thus avoided farming on the edges of their plots.

“The changes [as a result of land mapping] are the crops that we now plant, like sunflower, ... and also the money that I get from the sale – it is now more [...] Because now I farm freely and I know that my land area ends here and there.” - Male FGD respondent, LT, Mshawa Chiefdom.

Crop Rotation

In qualitative FGDs and KIs, respondents from several villages across all four chiefdoms reported using crop rotation to improve soil fertility and increase crop yields. However, most explained that this was not due to the TGCC interventions and the practice predated the TGCC project.⁶⁴ In some villages, FGD respondents said they were encouraged to practice crop rotation as a result of training by COMACO or government extension agents, while others said that this practice went back many generations. One respondent explained that while they had adopted rotation as a result of extension predating TGCC, they also continued to rely on synthetic fertilizers for their yields:

“The farming practice of crop rotation came a long time ago. The agriculture extension officer is the one who started teaching us about crop rotation. We do pot holing, ripping, we apply foliar fertilizers. ... But the type of soil we have here mainly requires [synthetic] fertilizer. It is the fertilizers which work well, because [when you apply them] you are able to harvest maybe seven bags or eight bags depending on how big the land you have cultivated is.” – Female FGD respondent, LT+AG, Mkanda Chiefdom.

While the quantitative and qualitative data indicated that crop rotation is widely used, FGD respondents in some villages explained that farmers with small land holdings have fewer options to do this. In these situations, not only is it difficult for farmers to diversify their crops, it is also difficult for them to justify using some of their very limited space for agroforestry trees.

“Nothing has changed [...] It’s because the fields are too small for example if you only have 2 acres you find that you are growing the same crop every year.” – Male FGD respondent, LT, Mkanda Chiefdom.

Fallowing

The impact analyses suggest that the TGCC interventions may have had a negative effect on the likelihood that a household leaves one of their fields fallow. This is contrary to the theory of change for customary land formalization, which anticipates that increased tenure security and proof of land rights could incentivize households to invest in fallowing as a way to restore soil fertility, since they would have less fear of someone else encroaching on their land while it is not actively being farmed. Instead, the follow-on results suggest households that received the Land Tenure intervention are even less likely to leave their fields fallow. In general, the IE data suggests that fallowing is very uncommon in the TGCC activity area. This may not be surprising, given high land pressure, households’ typically small land holdings and general unavailability of additional land for farming.

At baseline, 7 percent of fields were reported to have even been left fallow, and the incidence was nearly unchanged at follow-on, at 7.8 percent (N=372) of fields. Farmers in the TGCC activity area may also see little benefit to fallowing if soil fertility cannot meaningfully be improved in a short number of fallow seasons, or simply not be in a position to let some of their land rest, given their overall landholdings and heavy reliance on subsistence farming for their livelihoods. In addition, CLCs may not

⁶⁴ Respondents commonly described crop rotations of maize followed by groundnuts, then soy. Some also included tobacco.

be sufficient to overcome entrenched customary norms that may expect farmers to actively use or develop their land in order to maintain use rights to the land. Despite clear improvements to tenure security as a result of TGCC, households at follow-on stated that for 53.0 percent of their fields (N=1,287), they could not let the field lie fallow or unused without worrying about losing their rights to the field. A small proportion of households estimated they could leave any of their fields fallow for one year (12.8 percent of fields, or N=647) or two years (9.9 percent of fields; N=476).

Linkages between Tenure Security, CLCs and Agroforestry Uptake

The impact analysis at follow-on pointed to positive effects on agroforestry uptake as a result of TGCC programming. At follow-on, qualitative evidence from over 40 of 64 total FGDs also strongly suggests that many respondents feel that having a CLC makes them more likely to plant agroforestry trees. This sentiment was shared across genders and treatment groups that had received either the Land Tenure or Land Tenure + Agroforestry interventions. While it was clear that improved tenure security had played a role for many respondents, this theme was present regardless of whether respondents had only received the land mapping component of the land tenure intervention (but not the CLC), or had also received the CLC document.

It is also difficult to infer to what extent the impacts on agroforestry stem from the Land Tenure or the Agroforestry intervention. While higher tenure security as a result of land mapping or CLCs had clearly played a role for many, several participants also said they were interested in or had planted trees on their farms because they wanted to retain soil fertility, per what they had learned from COMACO, to better show the boundaries of their fields, and/or help to protect their land.

Some FGD respondents directly tied their increased tenure security obtained via land mapping and CLCs to a stronger incentive to undertake agroforestry. Others highlighted that knowing no one could take their land, now that they had the CLC, had encouraged them to plant agroforestry trees.

“Before, we were afraid even planting trees like gliricidia and musangu, thinking you are putting manure on this for someone else [in future]. After getting the certificates, we are sure that even if I put manure, I know very well that it is on my land with my family.” – Male FGD respondent, LT+AG, Maguya Chiefdom.

“On the planting of agroforestry, having CLC is very important and it makes one to be motivated to plant trees on his land, because between a person and a tree, the tree is the one with more years to live; so, if you plant a tree and then three years later you die and leave the tree, the ones to benefit [from that tree] are other people.” – Male FGD respondents, LT, Mnukwa.

“These trees we have been planting like musangu, we are now planting them freely because there is no one who can come and grab my field”. - Female FGD respondent, LT, Maguya.

“[Having a CLC] can give me power to plant [agroforestry trees], because it’s my certificate and I will know that what I am planting on my field is mine.” - Male FGD respondent, LT, Maguya.

Finally, some participants said that CLCs alone had not or would not motivate them to plant agroforestry trees. They mentioned that having seeds and developing an interest in agroforestry would motivate them to plant agroforestry trees whether they had a CLC or not (7 FGDs where respondents already had CLCs; 5 FGDs where CLCs had not been distributed; no differences by gender).

Agroforestry Participation, Uptake/Implementation, Interest and Benefits

As also discussed at 2017 Endline, respondents across several FGDs at follow-on described challenges with respect to communication and ownership of the Agroforestry component of the TGCC intervention, which worked through a lead farmer model. These memories appeared to still be fresh at follow-on, despite that the COMACO agroforestry intervention under TGCC had ended several years earlier. Qualitative discussions affirmed that relatively small core groups of around 15 villagers worked more closely with COMACO on the agroforestry intervention, while in some villages participation was gendered, with only women being fully involved in the intervention. In many cases, respondents described being dependent on COMACO for the tree seeds or seedlings, while others said they had not planted any agroforestry trees because they were not present when COMACO was giving out the seeds or seedlings, or that they had planted seeds in the nursery but had not been able to successfully transplant seedlings into their fields. Still, many respondents had a favorable view of COMACO, and spoke well of the many kinds of extension and support that COMACO had provided beyond the TGCC project – including teaching them about a range of climate smart practices (including ripping, ridging, using manure efficiently and potholing), setting up demonstration plots, recruiting lead farmers, and providing beekeeping support.

Some respondents noted that their small farm size was a limiting factor for planting agroforestry trees, while others said they would need support with seeds, plastic sleeves, and other inputs if they were to plant more trees in future. In 10 FGDs, half of which were in Agroforestry treatment villages, participants said they were not interested in planting agroforestry trees in because they had not seen any tangible benefits yet or there was no additional space for the trees.⁶⁵

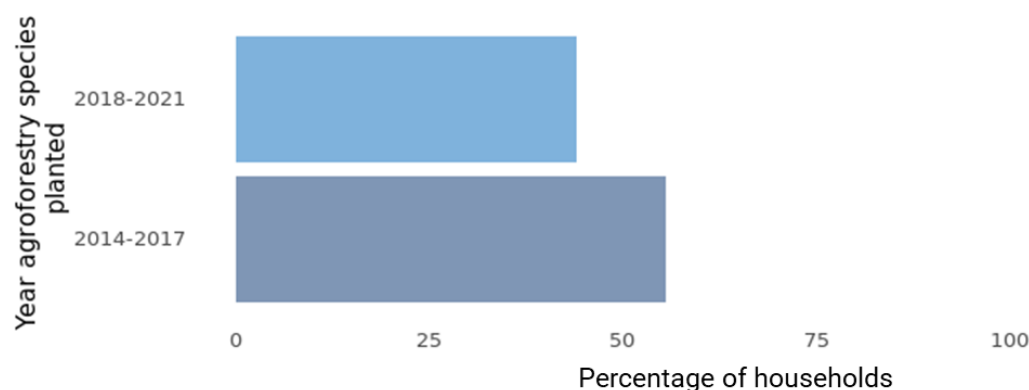
Descriptive summary statistics from the household survey at follow-on indicated that 27 percent of fields (N=1,298) in the sample had been planted with agroforestry trees or shrubs at some point, per respondent self-reporting. Of these fields in which farmers had planted agroforestry trees or shrubs, 75.1 percent (N=975) had been intercropped, most commonly with maize (63.9%; N=700). Gliricidia was the most commonly planted agroforestry species, planted on 82.2 percent of agroforestry fields (N=1,067), while Musangu was planted on 47.3 percent of the agroforestry fields (N=614). Other agroforestry species that COMACO supported were less common. Respondents reported less than 10 percent of agroforestry fields planted with *Sesbania sesban* (N=11), Ububa (N=10), cowpeas (N=4), pigeon peas (N=3), or other plants (N=13).

At the household level, 48.4 percent of all households in the sample (N=1,152) reported ever planting agroforestry trees or shrubs, while 40.6 percent (N=1,045) had agroforestry trees alive on at least one of their fields at the time of the follow-on survey in 2021. Among households that had ever planted agroforestry species on at least one of their fields, 55.8 percent (N=643) has planted during the TGCC intervention years (2014 through 2017), while 44.1 percent (N=508) had planted during the post-TGCC years in 2018 – 2021 (Figure 10). In other words, among households that had ever engaged in agroforestry, nearly all of them had done so either during the TGCC intervention or afterwards. By species, 38.8 percent of all surveyed households (N=999) reported they had planted Gliricidia on at least one field, while 22.2 percent (N=571) had planted Musangu. Pigeon peas, cowpeas, *Sesbania sesban*,

⁶⁵As two respondents said: “This is a very good program but now we are over populated no space to plant trees but it is a very good initiative it can help us with firewood in future.” (Male participant, LT, Maguya chiefdom). And: “When a person has been given a bigger field, they can plant trees but if the field is small, you can’t plant trees, trees like musangu, those tend to grow big.” (Female participant, LT+AG, Mkanda chiefdom).

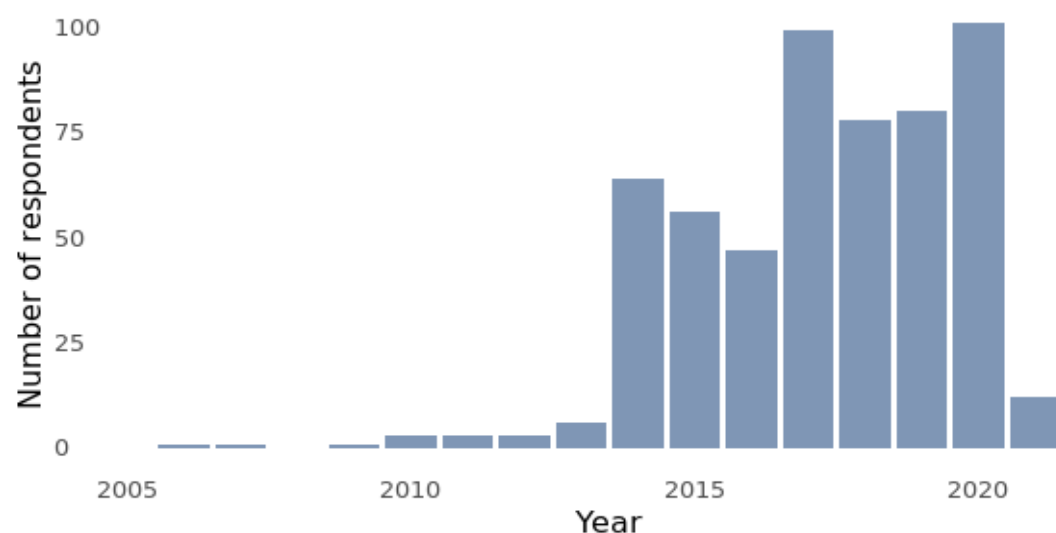
ububa, and other species were each planted by less than 2 percent of households. Among households that had ever planted agroforestry species, 86.7 percent (N=9990) planted *Gliricidia* and 41.1 percent (N=473) planted *Musangu*. Under 1 percent had planted pigeon peas, cowpeas, *Sesbania sesban*, *ububa*, or other species.

Figure 9: Year Households Planted Agroforestry Trees or Shrubs on their Fields.



The 2017 endline pointed to challenges with tree nursery establishment and maintenance as one of the key contributors to poor agroforestry seedling survival at endline. At follow-on, among households who said they had participated in a program run by COMACO, 11.2 percent (N=148) said at the time of the follow-on survey their village currently has a tree nursery, while another 31.2 percent (N=411) said the village had a nursery in the past 3 years but it was no longer operating at the time of the survey. While survey responses indicate that most agroforestry nurseries within villages became operational since 2014, consistent with COMACO's programming under TGCC, Figure 11 also shows that nursery openings may have expanded in the post-TGCC period after 2017. The Figure shows that respondent reporting on year of nursery establishment peaked for 2017 (18.0 percent; N=100) and 2020 (18.1 percent; N=101). Respondents also overwhelmingly believed that the nurseries were well-managed (86.5 percent; N=479).

Figure 10: Year that Agroforestry Nursery was Established in Respondent's Village



Information from village headpersons via the Leader Survey corroborate the above qualitative and statistical findings from households and provide some additional insights. Leaders from half of the follow-on IE village sample (N=126) indicated their village participated in an agroforestry program with COMACO. Where leaders could remember the year the program began, 81 percent (N=99) said it was during the TGCC years, 2014-2017. 84 percent of village leaders felt that the COMACO program had helped to improve agroforestry uptake in their village, and 44 percent (N=109) said at least some households in their village had planted agroforestry trees on their own, even if they had not directly participated in the COMACO program.

The vast majority of leaders surveyed, 78 percent (N=157), felt that households in their village had obtained at least some benefits from agroforestry to date. When asked what the most important challenge they felt discouraged people to plant agroforestry trees in their village, the responses provide insights into additional programming support that could be taken to further increase agroforestry uptake in their village. 58 percent (N=142) said villagers needed more general technical knowledge while 16 percent (N=40) said they needed help obtaining seedlings. The third most commonly cited need was help accessing enough water to keep seedlings alive (8 percent; N=19). Consistent with the household survey data, only 14 percent of village leaders (N=35) said their village has an active nursery for agroforestry tree seedlings currently, and COMACO supported them to establish the nursery for 90 percent of those villages. However, among those 35 villages, 51 percent of them were established in 2018 or after, which supports the upward trajectory in agroforestry uptake obtained via the impact analysis as well.

Gliricidia vs Musangu

Although COMACO promoted several different agroforestry trees and shrubs, the majority of respondents had planted *Gliricidia* or *Musangu*, and the qualitative findings point to clear differences in benefits experienced to date across those two species. Soil fertility benefits, shade, firewood, and improve soil structure were mentioned for both species, together with a reduced need for weeding due to the trees' natural herbicide properties.⁶⁶ Many participants across villages and chiefdoms linked tree plantings not just to short term benefits such as improved soil fertility and firewood, but also to long term benefits related to climate change such as more consistent rainfall patterns and cleaner air.

The qualitative data from follow-on suggests that many agroforestry takers had a better experience with *Gliricidia* than for *Musangu*. This could be because *Gliricidia* grows faster than *Musangu* and therefore the benefits are more tangible in the short term.⁶⁷ One respondent from a village in Mnu kwa chiefdom explained that they could see benefits from *Gliricidia* within 3 years, but it would take 8-10 years to see benefits from *Musangu*: *"For Gliricidia it grows fast we have started seeing the benefits, so things are better, but Musangu delays in growing, so we have not seen any."* – Male FGD respondent, LT+Ag, Mnu kwa.

Other respondents highlighted that the fast-growing *Gliricidia* trees could be used for firewood or to achieve soil fertility regeneration more quickly, while others spoke of a medicine and an insecticide that can be made from the leaves. A respondent from Maguya chiefdom provided the following detail about

⁶⁶ "...from the time we planted these trees, the weeds have gone away [...] when you plant those trees (*musangu* and *gliricidia*) when the leaves fall in the field, then you do potholing and put manure, all those weeds die out." (Female FGD respondents, LT+AG, Maguya chiefdom).

⁶⁷ Per TGCC, the agroforestry implementer may have preferred *Gliricidia* over *Musangu*, which could also be reflected in beneficiary comments.

the many uses of Gliricidia leaves, later adding that she also uses a Gliricidia leaf solution underneath her sacks of harvested maize to keep insects from infesting them.

“I discovered that gliricidia is one plant which kills all the insects in the fields so that the maize can grow well. [...] It has protection, if in your house, there are those ticks, you will get the leaves [...] you will spray in the house, when you put in your house, the ticks will die. Secondly, those diseases for the chickens are here, so when that comes, you will go and get the leaves again [...] I will put that in chicken feed [...] I noticed that the tree has a lot to offer.” – Female FGD respondents, LT+Ag, Maguya Chiefdom.

Musangu appears to have been less well-received. It grows more slowly than Gliricidia and some respondents said they had not seen any benefits at all, while respondents across several FGDs complained about its thorns, which they perceived to be poisonous or noxious in some way. Some respondents said they had removed the Musangu trees they had planted from their fields because the thorns posed too much of a safety risk, and since they are slower growing than Gliricidia the benefits were not apparent in the short term:

“No benefits, just thorns. They said they will add fertility to the fields but nothing has happened apart from thorns [...] If the thorn pricks into your foot, it will become swollen until you are admitted at the hospital. [...] Those are the challenges I encountered. That is the reason why I had to cut them down.” – Male FGD respondent, LT+Ag, Maguya chiefdom.

“Musangu most people are scared of it. It has sharp thorns and very painful, children cannot even manage to pass in the field. If it pricks you, it feels like snake bite.” – Male FGD respondent, LT+Ag, Maguya chiefdom.

Many respondents said they had simply removed the Musangu trees from their fields because of the risk of injury from the thorns, although others also mentioned benefits to soil fertility despite the challenges posed by the thorns. A small number of respondents mentioned they did careful pruning to try to protect against thorns, but even this could not guarantee they would not accidentally step on some they had missed:

“The thorns are difficult to address. Even if you pick and heap them, there will be some which will be missed. So, if you have not looked carefully, you step on them. [Some people who do] will have their legs swollen, others will have seepage.” – Female FGD respondent, LT+Ag, Mshawa chiefdom.

These qualitative findings complement household survey information on seedling and tree survival, planting arrangements and benefits and challenges experienced to date as well. Among households that had engaged in agroforestry, the vast majority said they obtained Gliricidia or Musangu seeds from COMACO (88.4 and 85.8 percent, respectively; N = 1,003 and N = 527).

The Tables below summarize responses from the household survey data at follow-on regarding the reasons why households chose to plant either of the two species, the benefits obtained so far and future anticipated benefits, together with the main challenges that households had experienced. Among households that had planted with species, this was primarily to obtain improvements to soil fertility and quality, as expected. Households also reported similar benefits experienced to date across the two species. Around one-third said the most important benefit they had experienced to date was an

improvement in soil fertility, and 23 or 28 percent said they had not received benefits yet, for Musangu and Gliricidia respectively. Twelve percent highlighted improved crop growth around the trees.

Households were also optimistic about the benefits they expected in the next 3-5 years, pointing foremost to soil fertility, crop growth and reduced need for fertilizer. However, a similar proportion of those who had planted Musangu said they expected no benefits, at 17 percent. For both species, 7 to 9 percent of respondents highlighted increased crop yields overall. The key challenges were also similar irrespective of species and focused on lack of water, pests, and fires. Among those who had planted Gliricidia, 21 percent said they had not experienced challenges, compared with 17 percent of those who had planted Musangu.

Tree Planting Challenges and Survival

Some respondents at follow-on mentioned challenges with seed or seedling survival, primarily due to pests (ants or termites) or mismatched timing of planting with respect to rains and seasonality, but also due to browsing by goats and trampling by cattle, and less commonly, uncontrolled fires during land clearing. Young Gliricidia trees were noted to be particularly vulnerable, and an attractive food for goats. GD participants also commonly mentioned young seedling loss due to ants. Qualitative data at follow-on suggests farmers had varied experiences with seedling survival, and that as seedlings became more established, threats to their survival lessened.⁶⁸ Challenges with low agroforestry seed or seedling survivorship were mentioned in 23 of 64 FGDs, but respondents also commonly indicated that many of the trees they planted were still alive at follow-on data collection. Challenges were more commonly raised in women's FGDs (16 of the 23 FGDs) relative to men's (7 of the 23 FGDs).

“We have planted but [on my farm] only some survived, about five or seven. But others have about 50 [trees still surviving].” – Male FGD respondent, Ag+LT, Mnukwa chiefdom

“When they are small, they die a lot from ants ... That was not resolved. Even if you go and see these agroforestry trees [now], they are far apart [in the field] because some of them were eaten by ants.” – Female FGD respondent, Ag+LT, Mshawa chiefdom

“The trees that are fully grown total 100.” – Female FGD respondent, Ag+LT, Mkanda chiefdom

⁶⁸ Some proportion of seedling loss is presumably expected in any case, although it is possible this was not communicated to farmers.

Reasons why households chose to plant Musangu and Gliricidia, current and future anticipated benefits, and main challenges experienced.

			Reasons for planting gliricidia	%	N
			Soil fertility	74%	769
			Improve soil quality	16%	170
			Improve moisture	3%	36
			Improve crop yield	3%	33
			Prevent soil erosion	2%	23
			Other	1%	12
Reasons for planting musangu	%	N	Benefits of planting gliricidia	%	N
Soil fertility	75%	448	Improved soil fertility	34%	527
Improve soil quality	18%	109	Improved crop growth around tree	12%	180
Improve moisture	3%	17	Reduced need for fertilizer	9%	145
Improve crop yield	2%	14	Higher overall crop yield	7%	102
Prevent soil erosion	2%	12	Other	5%	76
Benefits of planting musangu	%	N	Increased fuelwood availability	4%	68
Gained soil fertility	34%	285	Reduced weeds	4%	56
Improved crop growth around tree	12%	103	Reduced labor time on weeding	2%	30
Reduced need for fertilizer	9%	77	No benefits	23%	357
Higher overall crop yield	6%	49	Future benefits of planting gliricidia	%	N
Reduced weeds	5%	44	Improved soil fertility	35%	655
Increased fuelwood availability	2%	20	Reduced need for fertilizer	15%	291
Reduced labor time on weeding	2%	17	Improved crop growth around tree	15%	273
No benefits	28%	237	Higher overall crop yield	9%	167
Future benefits of planting musangu	%	N	Increased fuelwood availability	7%	123
Improved soil fertility	36%	345	Reduced weeds	4%	68
Improved crop growth	15%	148	Reduced labor time on weeding	3%	47
Reduced need for fertilizer	14%	130	Other	2%	29
No benefits	17%	159	Increased moisture in soil	1%	23
Higher overall crop yield	7%	71	No benefits	11%	204
Increased fuelwood availability	4%	41	Challenges of planting gliricidia	%	N
Reduced weeds	4%	36	Lack of water for seedlings/trees	18%	243
Reduced labor time on weeding	3%	26	Pests killed/damaged trees	15%	201
Challenges of planting musangu	%	N	Fires burned down trees	12%	154
Lack of water for seedlings/trees	18%	129	Animals grazed trees	11%	140
Pests killing or damaging trees	17%	125	Other	6%	85
Fire burning down trees	16%	116	Trees chopped down by mistake	6%	81
Trees chopped down by mistake	9%	67	Lack of knowledge	5%	67
Animals grazing on trees	8%	56	Difficulty transporting seedlings to fields	2%	27
Lack of knowledge	6%	47	Not enough labor to care for trees	2%	27
Lack of labor	3%	21	Could not access seeds	1%	17
Transporting seeds to fields	2%	17	No challenges	21%	282
Did not see benefits quickly	2%	14			
Could not access seeds	2%	13			
No challenges	17%	124			

Linkages between Agroforestry and Village Land Use Rules and Land Management Practices

The TGCC IE was also designed to explore the extent to which changes in village-level land use rules and management practices may help to incentivize agroforestry. Unregulated fires and grazing/browsing across fields was highlighted as a potential barrier to agroforestry uptake during IE scoping and support for clarifying these rules and practices was one element of TGCC programming anticipated at baseline. In practice, the TGCC activity reduced its focus on this over the course of activity implementation. The 2017 endline explored whether villages that had adopted certain land use rules related to fires and grazing had experienced higher agroforestry survival rates.

Seedling survival was less salient at follow-on, and so potential linkages with different types of land use rules may be less relevant for this round. Still, descriptive statistics from the household survey indicate that at follow-on, most villages had rules to regulate or restrict fires, grazing, and tree cutting, but not tree ownership or fencing. For some types of land use rules, such as grazing, the majority surveyed said that most people or everyone obeys the rules. This appears to be an improvement over 2017 endline.

Results suggest that villages may be more challenged to enforce rules related to fires and tree cutting. For example, 16.7 and 12.5 percent of households reported that no or only a few households obey rules regarding fires or tree cutting, respectively, suggesting more uneven compliance (for comparison, only 6.1 percent of households said the same with respect to grazing rules). In addition, 21.4 and 16.1 percent of households said that people are never punished or only rarely, depending on who they are, for breaking rules related to fires or tree cutting. Less than 10 percent of households said the same for other types of land use rules. As a whole, the findings suggest that improvements to land use rules and enforcement could have helped lay the groundwork for farmers to feel more comfortable investing in agroforestry, although this was not a strong theme in the qualitative data collection at follow-on.

OUTCOME FAMILY IV: AGRICULTURAL PRODUCTIVITY

OF4 has two indicators that measure respondents' self-reported agricultural productivity impacts related to agroforestry practices, for households that practiced agroforestry on any field.

SUMMARY OF KEY FINDINGS

- The follow-on regression analysis does not find evidence for an impact of the TCC interventions on either respondent self-reported changes to crop yields or improved crop growth, as a result of engaging in agroforestry. This is consistent with the 2017 endline. However, these regression analyses are particularly underpowered due to the small number of households at baseline that practiced agroforestry.
- Qualitative findings from follow-on suggest that by 2021, farmers who engaged in agroforestry appear to be starting to realize a range of benefits, including improvements to their crop growth or yields. This represents an improvement over impacts measured at 2017 endline, and suggests that benefits to farmers who engaged in agroforestry as a result of TGCC are indeed starting to materialize over the longer-term.
- At follow-on, participants from 27 of 64 FGDs conducted said that soil fertility or yields on their farms had improved as result of agroforestry trees they had planted (equal distribution by gender). All but 3 of these FGDs were from villages that had received either the Agroforestry or the Land Tenure intervention.

IMPACT ANALYSIS RESULTS

Table 10 below shows the overall and subgroup impacts of the TGCC interventions on OF4 indicators.

Table 10: Summary of livelihoods Impact Results by treatment group, ITT

Impact Indicator	Agro-forestry	Land Tenure	Land Tenure + Agroforestry
HH reported experiencing improved crop growth as a result of agroforestry (P)			
HH reported experiencing higher overall crop yield as a result of agroforestry (S)			

IMPACT ESTIMATES CHARTS

Figure 11: ITT and TOT impact Results

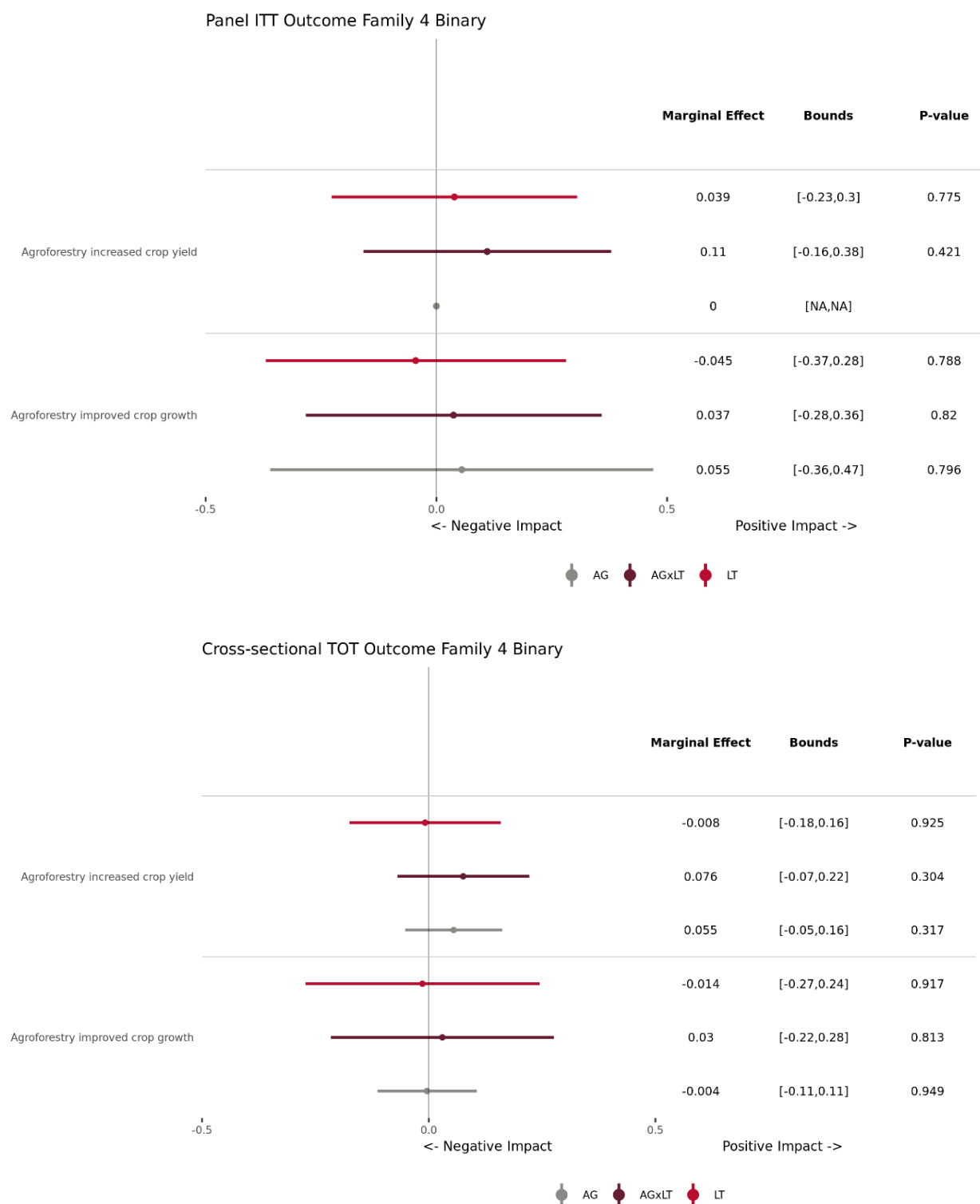
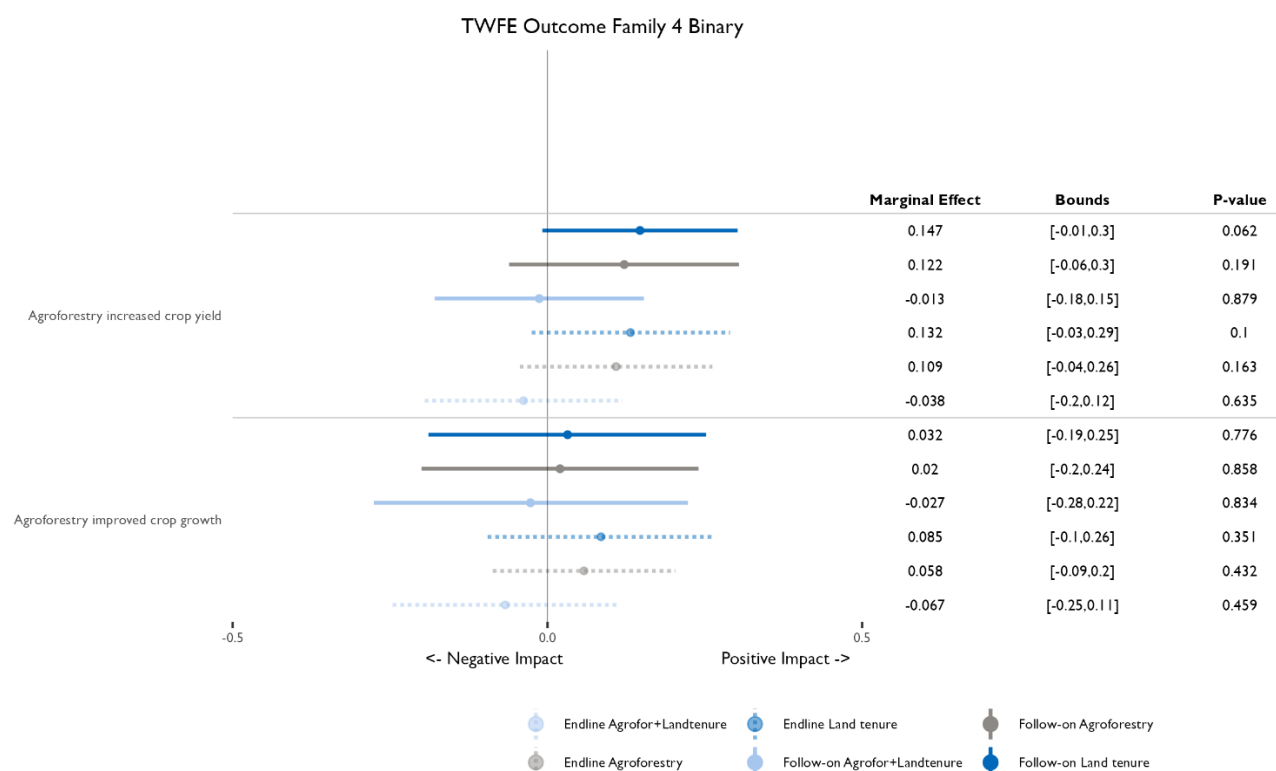


Figure 12: TWFE Model



Consistent with the 2017 endline, neither the ITT nor the TOT results at follow-on find evidence for an impact of the TCC interventions on either respondent self-reported changes to crop yields or improved crop growth, as a result of engaging in agroforestry (Figure 12).

However, we also note that the ITT panel analyses is particularly underpowered for these indicators due to the small number of households at baseline that practiced agroforestry. Supplemental cross-sectional ITT analysis run on the follow-on data only does provide some evidence that farmers believed their agroforestry practices had resulted in higher crop yields, for households in the Land Tenure + Agroforestry treatment group. At follow-on, the average household in the Agroforestry + Land Tenure treatment group was 8.6 percentage points more likely to report that practicing agroforestry on any field improved crop yields, relative to households in the control group (significant at the 5% level). Restricting the analysis to households at follow-on from Mshawa chiefdom only (where the initial treatment assignments at baseline are still fully preserved at follow-on) yielded a similar result for households in the Land Tenure treatment group, whereby on average households in this group had an 8 percentage-point increase in the likelihood they reported higher crop yields due to agroforestry practices compared to control households (significant at the 10% level).

SUPPLEMENTAL EXPLORATORY ANALYSIS

The TWFE results, which incorporate data from all three rounds of data collection to estimate the average impact of each treatment group at endline in 2017 and at follow-on in 2021 relative to baseline, suggest an improvement in crop yields among household in the Land Tenure treatment group at follow-on (Figure 13). On average, households in this group have a 14.7 percentage point increase in the

likelihood they reported experiencing an increase in crop yields as a result of agroforestry, relative to the baseline average (significant at the 10% level). TWFE results related to crop growth were not statistically significant.

Our exploratory analyses of differential impacts for households that received the Land Tenure intervention in 2014-2015 relative to 2018-2019 finds that households from villages in the 2014-2015 cohort were 12.1 percentage-points more likely than the control group to report improved crop growth due to agroforestry (significant at the 1% level). Households from villages in the 2018-2019 cohort had a 9.6 percentage-point higher likelihood of reporting improved crop growth as a result of their agroforestry practices, and they also had an 8.3 percentage-point higher likelihood of reporting improved crop yields due to the same (each significant at the 5% level).

Moving to the 2014-2015 versus 2018-2019 cohort TOT results for certificate holders only, the Land Tenure + Agroforestry 2014-2015 group is 11.4 percentage-points more likely to report experiencing higher overall crop growth due to agroforestry compared to the control group (significant at the 10% level), though results are not significant for crop yields. Conversely, the later Land Tenure + Agroforestry 2018-19 cohort was 16.1 percentage-points more likely than the comparison group to report improvements in crop yield due to agroforestry (significant at the 10% level), but there was no discernible difference in responses related to crop growth. In sum, these analyses suggest that households who received the combined Agroforestry and Land Tenure interventions earlier, under TGCC, appear to perceive improvements with respect to their crop growth, while those who were only part of the Agroforestry cohort under TGCC, and later also received the Land Tenure intervention under ILRG, appear to perceive success in terms of their crop yields.⁶⁹

SUBGROUPS

The subgroups analysis for this outcome family is highly underpowered, as it is run on the subset of households that practiced agroforestry and this results in lower sample sizes across subgroups than for the other outcome families. It is therefore not surprising that the subgroups analysis does not find evidence of heterogeneous treatment effects on these indicators of agricultural productivity, across the subgroups analyzed.

DISCUSSION

The 2017 endline IE results found no evidence for impacts from the TGCC interventions on either of the two indicators of agricultural productivity changes stemming from agroforestry. This was not surprising given the lack of impacts on agroforestry uptake at the 2017 endline. At follow-on, in 2021, the OF4 impact estimate results suggest that farmers who engaged in agroforestry may be starting to realize a range of benefits from that, including improvements to their agricultural productivity.⁷⁰ Although the impact results are mixed, they are supported by qualitative findings at follow-on.

⁶⁹ The evaluation team cautions against reading too much into differences across these two outcomes, however, since they ask farmers to report on a fairly nuanced difference regarding the same overall concept. Crop growth relates more to the perceived health of the plants in the field, while crop yield relates to the amount harvested per area of land. In practice, however, respondents may not have made this distinction.

⁷⁰ This IE does not measure impacts to farmer self-reported yields or agricultural income directly, given widespread concerns over the reliability of such data. Instead, it focuses on farmers' perceptions of improved yields as a result of their agroforestry practices. While not a focus of the IE analysis, we note that descriptive statistics at follow-on indicated that for the 2020-2021 agricultural year, the average main crop harvest per

Linkages between Agroforestry and Improved Crop Yields

Farmer self-reported improvements in crop yields as result of agroforestry saw statistically significant increases from baseline to follow-on across several of the supplemental models and treatment groups, which signals modest improvement in one key metric of agricultural productivity. This pattern is also supported by the qualitative data at follow-on, where respondents from 27 of 64 total FGDs (equal distribution by gender) said that soil fertility or yields on their farms had improved as result of agroforestry trees they had planted. Only three of these 27 FGDs (11 percent) were from villages that had not received either the TGCC Agroforestry or the Land Tenure intervention.

“We have benefited because before the agroforestry we used to experience low harvest but after we planted agroforestry in our fields, we are now harvesting enough crops.” – Female FGD respondents, LT+AG, Mkanda chiefdom.

In another 6 FGDs (of which 4 were villages in the AG or LT+AG treatment groups), participants said it was too early still to see benefits from their agroforestry tree planting on fields, because their trees were still young and it was too early to see the full range of benefits (6 FGDs, of which 4 were AG or LT+AG villages; 5 of these 6 FGDs were with men).

One respondent from Mkanda chiefdom explained that even though harvests have gone up due to benefits from agroforestry trees, this has not translated to higher incomes due to increases in prices of other inputs.⁷¹ Some FGD respondents cited rainfall as the primary deciding factor for any changes in yields or income, while others pointed to access to seeds as the main limiting factor. Others highlighted limiting factors like small farm size and a lack of irrigation systems. One farmer explained why he had not been able to increase his crop production or yields as such:

“The truth is that we do have a CLC, but we are now many and the land is not enough. So we have shared small portions [of land] [...] In addition, we may have seeds but the problem is the watering. ... because we have no pipes.” – Male FGD respondents, LT+AG, Mkanda chiefdom.

A gendered limiting factor that emerged across some villages was that women are less able to recruit or hire additional labor to manage their plots and are thus limited to growing what they can manage as individuals. While men were able to recruit their wives or other family members or allocate money for hired labor, gender norms dictated that this was not an option for women. One female respondent in from Mshawa chiefdom explained how, due to this, CLCs could not make a difference in her view:

“Depending on your strength, whether you have a certificate or you don’t have a certificate, you are going to cultivate less land. It’s a small field and that is all, the other part will have to sleep (left fallow). [...] if you have four acres, that certificate, if they give me that certificate, with one pair of hands, for you to manage that four acres it is hard. The other part [of the field] will sleep because it is one pair of hands (I just alone) and there is nothing you can put there.” – Female FGD respondent, Control, Mshawa.

field was 50.99 kg (SD=451.8), and farmers reported that roughly half of their main crop harvest was sold or planned for sale. There was enormous variation in the farmer self-reported income from those main crop sales, from 4,5000 ZMW to 9,000,000 ZMW per field (mean = 8,615 ZMW and SD = 190,392 ZMW), underscoring the challenges in using such data reliably for an impact analysis.

⁷¹ FGD respondents across several villages described being squeezed between several limiting factors for productivity, especially fertilizer. Discussions gave the impression of declining revenue for many farmers at the time of follow-on data collection.

The main limitation on productivity and yields, as cited by FGD respondents across 20 villages across all four of the chiefdoms, was the price of fertilizers. Several respondents highlighted that even if they could expand the area they farmed as a result of increased confidence over their land boundaries, they did not do so because they could not afford fertilizer for the additional area. Even with some tangible soil fertility benefits reported from the tree plantings, these benefits were not extensive or reliable enough to replace farmers' needs for synthetic fertilizer.

“Nowadays the challenge we are having is lack of fertilizer. Even if you have a big land, you cannot farm a big portion of it without enough fertilizer. You have to measure the portion [of land] that will accommodate the amount of fertilizer you have in stock.” – Male FGD respondent, LT+AG, Maguya Chiefdom.

Thus, while agroforestry interventions that promoted tree plantings and other fertility saving practices may have helped some farmers to mitigate this situation to some extent, their impacts do not appear to be sufficient to significantly reduce farmer's reliance on synthetic fertilizer, perhaps given the state of degradation in soil fertility that farmers in the TGCC activity area experience. Moreover, increasingly high prices for synthetic fertilizer appear to have contributed to farmers' economic crises and inability to realize increased profits even if their production and yield has increased.

OUTCOME FAMILY V: LIVELIHOODS

OF5 indicators serve as proxies for two aspects of household economic wellbeing that customary land formalization is theorized to potentially affect, namely whether improvements to household tenure security and the possession of land document spur changes to land rental activity or household receipt of credit. This IE assesses those aspects by looking at impacts on the likelihood that households engage in land rental activity as a landlord and whether they obtained a loan from a formal source of credit, defined here as a bank or microcredit institution.

SUMMARY OF KEY FINDINGS

- The 2017 endline found no evidence for TGCC impacts on land transactions or other indicators of household livelihoods assessed. At 2021 follow-on, regression analysis finds that on average, households in villages that received the Land Tenure intervention were 1.6 percentage points less likely to report being engaged in renting out land. There is no evidence for impacts on the likelihood a household obtained a loan from a formal credit source.
- Exploratory analyses of differential impacts for households that received the Land Tenure intervention in 2014-2015 relative to 2018-2019 does not find any discernible differences in livelihood responses among those who received the Land Tenure intervention under TGCC relative to those who received it in the post-TGCC era.
- With respect to credit, qualitative findings and descriptive summary statistics from the household survey show that interest in and obtaining loans from formal sources of credit is still exceedingly uncommon in the TGCC activity area. Respondents are also concerned that using the CLC and their land as collateral for such loans could be disastrous for them in the event of defaults.
- With respect to changes in renting out land as a result of TGCC's Land Tenure intervention, respondents from only five of 32 villages in the qualitative sample felt the introduction of CLCs led to more people renting out their land. However, not all respondents saw this as a positive change. Instead, this was seen to have altered more collegial norms around land sharing and borrowing out land that had been more common previously. Household survey data at follow-on suggests that renting out land is still very uncommon, with only 5.4 percent of fields (N=258) reported to have been rented in. However, this was twice as common as borrowing-in land (2.7 percent of fields at follow-on; N=119).

IMPACT ANALYSIS RESULTS

Table II below shows the overall and subgroup impacts of the TGCC interventions on OF5 indicators.

Table II: Summary of Tenure Security Impact Results by Treatment Group, ITT

Impact Indicator	Agro-forestry	Land Tenure	Land Tenure + Agroforestry
HH engages in land rental activity as landlord (S)		-0.02	
HHs obtained formal loan from bank or microcredit institution (S)			

IMPACT ESTIMATES CHARTS

Figure 13: ITT and TOT impact Results

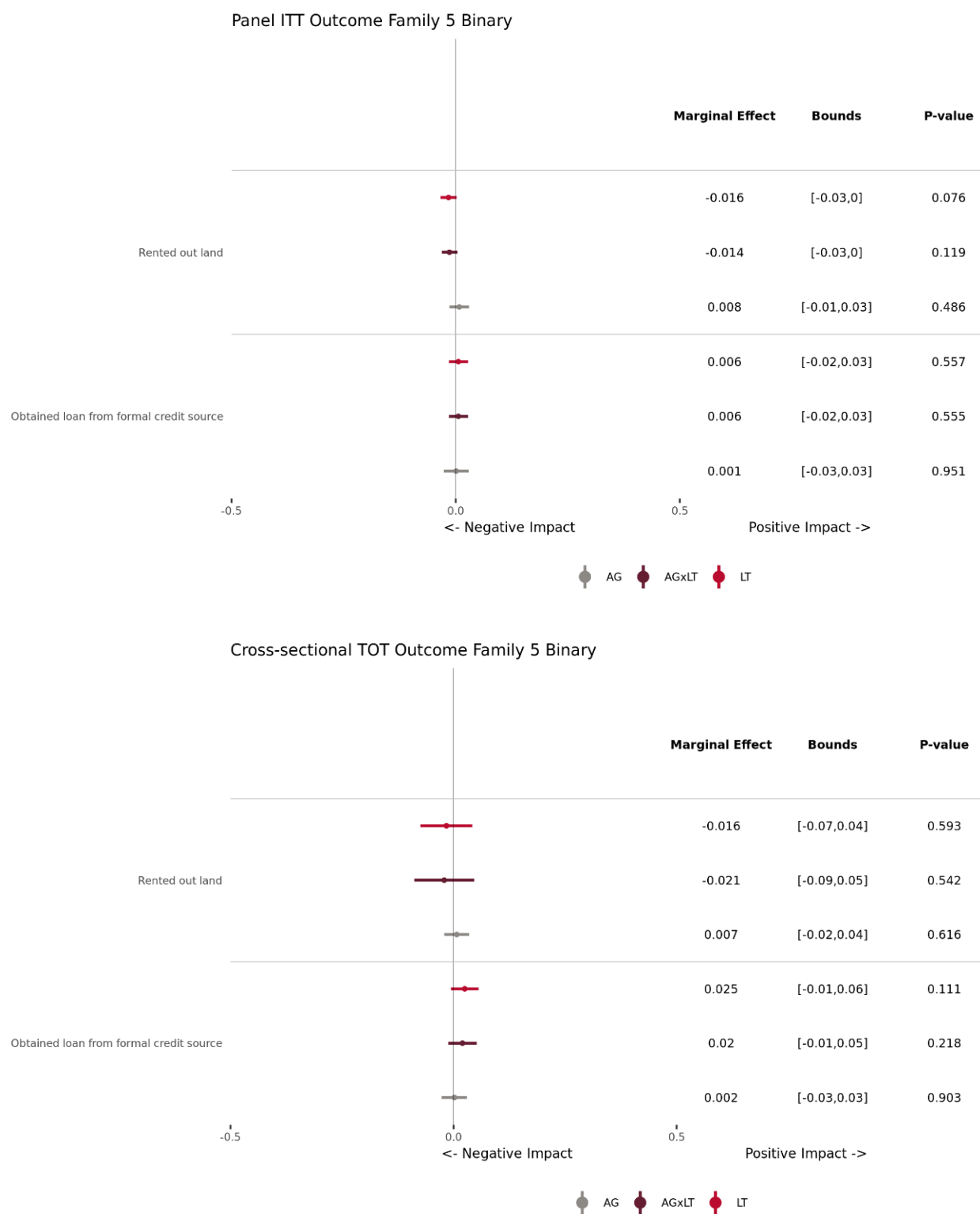
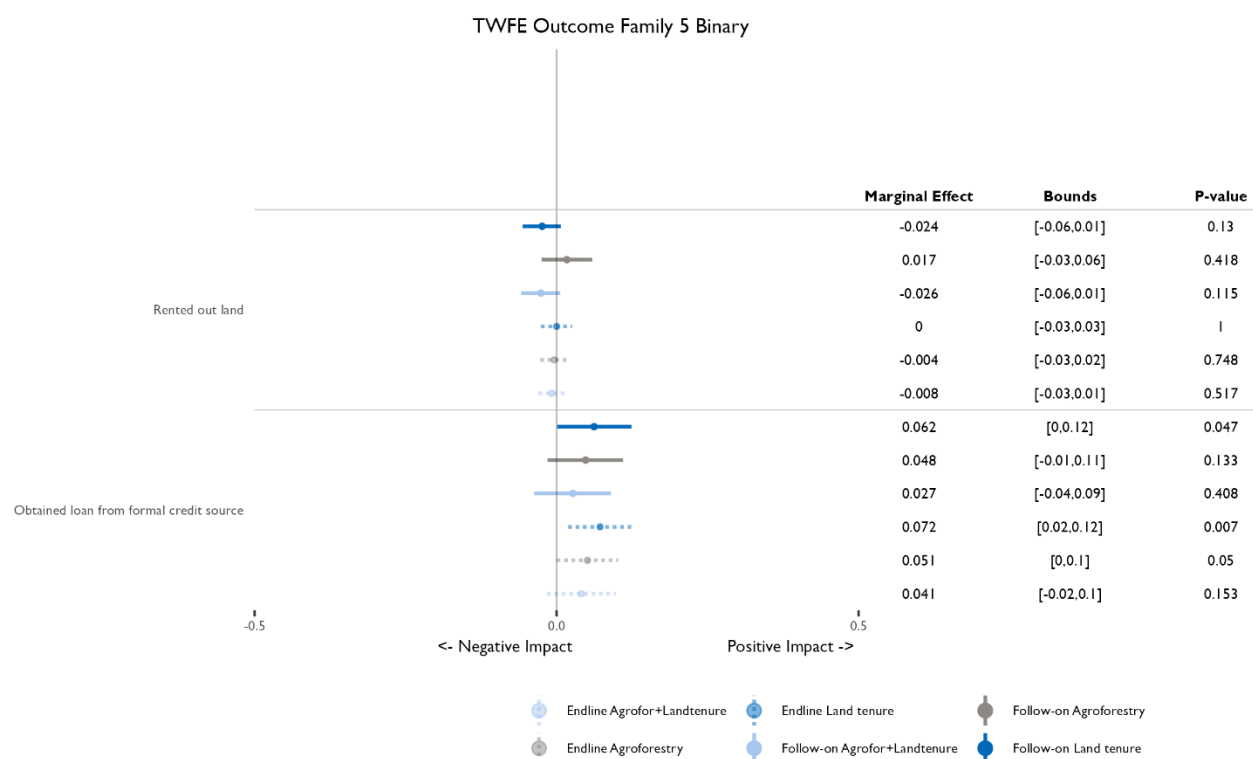


Figure 14: TWFE Model



At follow-on, the ITT regression results suggest that on average, households in the Land Tenure treatment group were 1.6 percentage points less likely to report being engaged in renting out land, compared to the control group (significant at the 10% level), while there is no evidence for impacts on the likelihood a household obtained a loan from a formal credit source (Figure 14).

The results on renting out land that are obtained through the TOT analysis are similar in magnitude, but the confidence intervals are wider and none of the results retain statistical significance. The TOT results for credit are also not significant, although the magnitude of the point estimates is larger and suggest a positive trend for households in the Land Tenure and Land Tenure + Agroforestry treatment groups.

SUPPLEMENTAL EXPLORATORY ANALYSIS

In contrast, the exploratory TWFE analysis of dynamic effects across the Baseline to Endline period (2014-2017) and Endline to Follow-on (2018-2021) show a statistically significant increase in the likelihood, on average, that households in the Land Tenure treatment arm during the follow-on period reported obtaining a loan from a formal credit source in that period, relative to the baseline average (Figure 15). The likelihood that households in the Land Tenure treatment group received loans increased by 6.0 percentage points, on average, during the follow-on period, compared to baseline (significant at the 5% level or 1% level). However, loans from formal sources remained uncommon

across rounds and evidence for a link between TGCC's interventions and increased credit was not supported by the qualitative findings.

The exploratory analyses of differential impacts for households that received the Land Tenure intervention in 2014-2015 relative to 2018-2019 does not find any discernible differences in livelihood responses among those who received in the Land Tenure intervention under TGCC relative to those who received it some years later under ILRG.

SUBGROUPS

The subgroups regression analyses, which is only powered to detect relatively large effects, does not find evidence for heterogeneous treatment effects on the agroforestry and CSA field investments indicators, across any of the subgroups analyzed.

DISCUSSION

IE results at 2017 endline found no evidence for impacts of the TGCC interventions on any of the livelihoods indicators. At endline, these were seen as longer-term outcomes that were unlikely to have changed by 2017 endline, given the short time period that had elapsed between the completion of the TGCC land tenure intervention and endline data collection. The endline team surmised that these outcomes may take several additional years to materialize.

At follow-on, the impact estimate regression results for OF5 do appear to provide some evidence for impacts on the two livelihoods indicators, although qualitative findings call into question the extent to which these stem from customary land mapping and CLC issuance. With respect to credit, a causal pathway from TGCC's Land Tenure activities to increased credit uptake is particularly unclear,⁷² given that the CLC is not widely recognized in a lending setting⁷³ and the high proportion of Land Tenure households that still had not received the document by follow-on in any case. It is also apparent that interest in and obtaining loans from formal sources of credit is still exceedingly uncommon in the TGCC activity area, while respondents are also concerned that using the CLC and their land as collateral for such loans could be disastrous for them in the event of defaults. With respect to land rentals, qualitative findings at follow-on also provide insights into reasons for a lack of impact, and suggest that renting out land remains uncommon and is also at times perceived as a negative effect of land documentation as it alters established customary norms in villages regarding land sharing and borrowing.

Linkages between CLCs and Formal Credit

Qualitative data collection at follow-on strongly suggested that CLCs are not being used to obtain loans from formal sources. No respondent in any FGD or KII at follow-on reported using their CLC or receipt to obtain this type of loan. Respondents cited three main reasons why: 1) they did not realize that it was possible to do so⁷⁴; 2) they did not know of any formal lenders or said these types of lenders

⁷² This is different from a country context where the certificate obtained via customary land formalization is legally recognized and embedded in the national land administration system, and recognized as a valid form of collateral by formal lenders.

⁷³ In the post-TGCC era, ILRG took steps to partner with lending institutions to explore developing a loan product tailored for the CLC and TGCC context, but this had not been piloted in the chiefdoms covered by this IE by follow-on data collection.

⁷⁴ And indeed it generally is not, in the Zambian context, per TGCC implementers.

did not reach their village, or 3) they were afraid of defaulting on the loan and losing their land, or getting arrested in the case of default.

Others explained that since their agricultural revenues are dependent on many unpredictable and external factors, especially given that most of them are reliant on rainfed systems given insufficient irrigation systems, using land as a collateral for loans could have severe consequences not just for the recipient of the loan but also for future generations that would have inherited their land. Some respondents characterized lenders as predatory, and worried that loans were designed to facilitate land grabs. Thus, one respondent said they would avoid using a CLCs for a loan even if they could access loans in other ways:

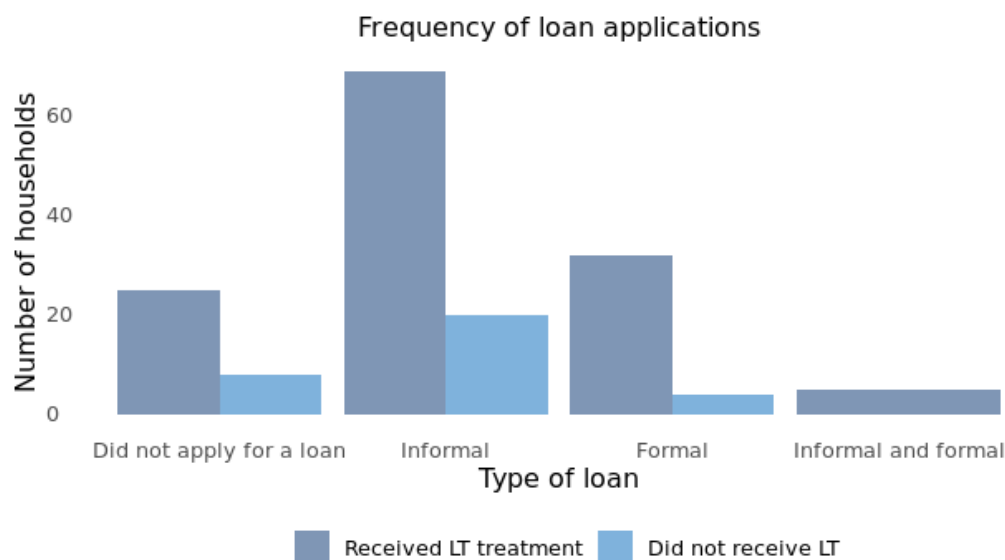
“On using the CLC, you can manage to use it but the challenge is that sometimes a loan is difficult to pay back. Now if you use the CLC you can end up losing your land on the understanding that you have failed to pay back the loan. That is why we don’t use the certificate. Some of us have accessed some loans but did not use the certificates. We had our TPIN numbers generated and accessed loans from Vision Fund but did not use our certificates. For the certificate, we cannot give it to another person because if we do, it is easy [for them] to grab land from us. So we used other means [to obtain the loan], not the certificate.” – Male FGD respondents, LT+AG, Mkanda Chiefdom.

Another respondent described their concerns related to taxation and other potential negative consequences of using the CLC for a loan:

“They say if you get a certificate government might think of giving you some soft loans based on farming when you receive that loan then you fail to pay back then they come and get your certificate because it acts as a surety just like what they do at the lending institution. So, people will be forced to work hard, if I don’t pay, they will get my land. So here is a question mark for someone to see the advantage of a certificate...” – Male FGD respondents, LT+AG, Mnukwa Chiefdom.

Descriptive summary statistics from follow-on shed additional light on this issue. At follow-on, only 6.3 percent of households (N=163) reported wanting to apply for a loan in the year prior to survey, and 80.4 percent (N=131) of those households were in villages that received either the Land Tenure or Land Tenure + Agroforestry interventions by follow-on. Of those, around half (54.6 percent; N=89) did apply for an informal loan, 22.1 percent (N=36) applied for a formal loan, 3.1 percent (N=5) applied for both a formal and informal loan. 20.2 percent (N=33) did not end up applying for a loan (Figure 15). The most significant reason that households did not apply for a loan was because they were not connected with people in the village who could give out loans (78.8 percent; N=25/33).

Figure 15: Frequency of Loan Applications by Land Tenure Intervention Status



For the 89 households that applied for a loan from an informal credit source, those loans were most often requested from moneylenders (61.1%; N=52), and sometimes from family members (10.6 percent; N=10) and friends (25.9 percent; N=22), or almost never from the headman (1.1 percent; N=1). Respondents stated these loans were requested mostly so they could make investments in their fields, including buying fertilizer and seedlings (N=34; 38.2 percent) or basic household needs and consumption (19.1 percent; N=17). Other common uses of these loans included business investments (16.9 percent; N=15) and education or school fees (N=12; 13.5 percent).

The loan amount requested from informal credit sources ranged from 25 to 20,000 ZMW, with an average of 1,333 ZMW (\$84; SD 2,640 or \$167). 80.9 percent of those who requested such a loan received it - those that did not receive the loan cited various reasons, including lacking personal connections to the lenders (34.6 percent; N=9) and not hearing back yet (30.8 percent; N=8).

At follow-on a very small number of households said they had applied for a loan from a formal credit source (N = 41). These loan requests were most often directed toward lending groups (56.1%; N=23) and microfinance institutions (41.5%; N=17), and very rarely to banks (N=2; 4.9%). Like informal loans, the reasons respondents sought credit from formal sources were most commonly to make field investments (N=24; 58.5%), or for business purposes (N=11; 26.8%). The amount requested also ranged widely, between 200 and 17,000 ZMW (\$13 and \$1,075), while the average was more than twice that from informal sources, at 2,768 ZMW (\$175; SD 2,819 ZMW or \$178). Three-fourths of these loan requests from formal credit sources were approved (75.6%; N=31).

Linkages between CLCs and Renting Out Land

With respects to change in land renting as a result of CLCs, respondents from 5 FGDs stated that the introduction of the CLCs has led to more people renting out their land to others as a means to generate income (4 of these FGDs were in LT or LT+Ag villages; and 4 were held with women). Four of these 5 FGDs were from villages in Mkanda chiefdom, while one was from Maguya chiefdom.

“Having a certificate is a good thing. On my field no one will tell me what to do; I am free to do what I want. I can even put someone on my field to rent it – to make money on my field.” – Male FGD respondent, Mkanda chiefdom.

However, not all respondents saw the increase in land renting as a positive change. Respondents from 4 FGDs felt it had altered collegial norms around land sharing and borrowing within villages that had been common under the customary system prior to issuance of CLCs. While land owners with surplus land may be benefiting from the ability to rent out their land with confidence, it is possible that those with insufficient landholdings may be further disadvantaged by this situation if they had been able to borrow land previously but cannot afford the rental prices. The two quotes below illustrate:

“The land certificate also came with bad situation. It gave birth to a rampant behavior of renting out fields at a higher price. Most people felt that ownership and those who didn’t have enough [land] suffered a setback as they no longer could borrow land for free” – Female FGD respondent, LT+Ag, Maguya chiefdom.

“From the time we were given the certificates, there is nothing like sharing, what has happened now is we are renting, a long time ago we never use to rent just because it your field now, you will not borrow your friend thinking that it will not be enough, give me some so that I plant, unless you have to produce money. The relationship has ended.” – Female FGD respondent, LT+Ag, Maguya chiefdom.

At follow-on, descriptive summary statistics from the household survey data collection indicate that renting in, borrowing in, renting out and borrowing out land do all take place in the TGCC activity area. Although inheritance was overwhelmingly the primary means by which respondents had acquired the plots they used at follow-on, 5.4 percent (N=258) of fields in the follow-on sample were reported as rented in by the survey respondent, while 2.7 percent (N=119) were borrowed in.

OUTCOME FAMILY VI: FOOD SECURITY AND WOMEN'S EMPOWERMENT

OF6 reports on two food security indicators, six indicators related to land tenure security and women's control over land, and two indicators related to wives' participation in production and economic decisions, asset and income control. These indicators are summarized in Annex C. Responses for OF6 indicators were obtained via a wives' survey module that was newly implemented for the TGCC IE during the 2021 follow-on round of data collection. Because this module was not administered during previous survey rounds at baseline and 2017 endline, impact estimates for indicators in this outcome family are obtained from cross-sectional ITT and TOT models using data from the 2021 survey round only, complemented by descriptive statistics from the 2021 round.

SUMMARY OF KEY FINDINGS

Food Security: Overall, levels of reported hunger were relatively low at follow-on, which is important to note given that data collection was conducted during the COVID-19 pandemic where there are overarching concerns on potential disruptions to supply chains, labor availability, inflation, and other potential factors that could affect food security in rural areas of Zambia.

- At follow-on, 10.5 percent of households surveyed suffered from moderate to severe hunger, based on the Household Hunger Scale. There were no significant differences in the degree of hunger experienced based on TGCC treatment status. Hunger was unevenly distributed among chiefdoms, and more pronounced in Mkanda and Mshawa.
- Impact analyses via cross-sectional regressions also found no evidence for average impacts of the TGCC intervention on food security. Supplemental regression analysis restricted to households who received the CLC suggests households that received the joint Land Tenure + Agroforestry intervention and received a CLC saw a small but significant 0.28 point reduction in their household hunger scale score and a half-month reduction in the number of hunger months they reported. However, this could be driven to some extent by the imbalance on hunger across chiefdoms.

Women's Empowerment:

- Descriptive summary statistics at follow-on were aligned with several gendered aspects of women's empowerment and entrenched customary norms that the literature suggests women face over access and control of land, size of land holdings and types of disputes that women commonly face. Men were reported as the primary decisionmaker for 69 percent of fields belonging to surveyed households at follow-on, while women were reported as the primary decisionmaker for 29 percent of fields.
- The impact regression analyses based on TOT results show:
 - A 27 percent increase in the likelihood the female primary decisionmaker in a household personally has a CLC as documentation for land used by the household.
 - A 59 percent increase in the likelihood she is familiar with CLCs in Zambia.
 - A 1.2 unit increase in the number of assets reported jointly owned by husband and wife.
 - However, descriptive statistics highlight that a significant gender gap still exists in the level of familiarity with CLCs. One-third of primary female decisionmakers stated that they were familiar with CLCs, compared to almost half (46 percent) of primary male decisionmakers.

Intimate Partner Violence:

- Overall, 40.6 percent (N=269) of wives surveyed at follow-on reported experiencing any form of IPV, which is slightly lower but similar to Zambian national statistics on the same. The most commonly reported

forms were controlling behaviors, while reported experience of physical or sexual violence was substantially less common.

- The impact analyses did not find evidence for a change in the risk of experiencing IPV as a result of the TGCC interventions and relative to the control group probability of 44.2 percent. The findings are similar for the ITT and TOT analyses and suggest that TGCC programming was not associated with a change in wives' experience of IPV.

IMPACT ANALYSIS RESULTS

Tables 12 and 13 below summarizes the impact estimate results for key food security and women's empowerment outcomes.

Table 12: Summary of Food Security and Women's Empowerment Impact Results by Treatment Group, ITT

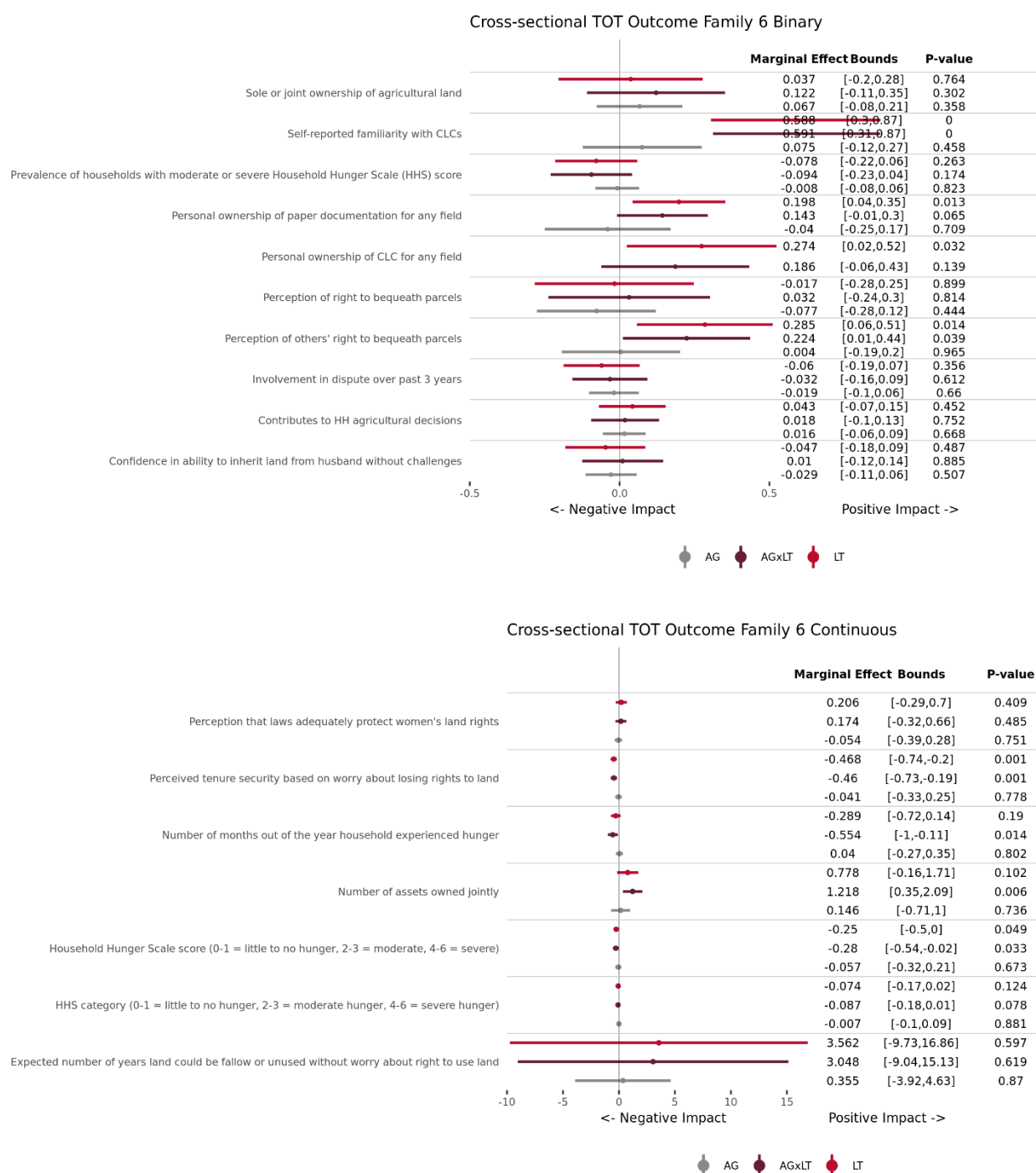
Impact Indicator	Agro-forestry	Land Tenure	Land Tenure + Agroforestry
Household Hunger Scale score (0-1 = little to no hunger, 2-3 = moderate, 4-6 = severe)			
Number of months out of the year household experienced hunger			
Perception that laws adequately protect women's land rights			
Perceived tenure security based on worry about losing rights to land			
Number of assets owned jointly			0.59
Personal ownership of CLC for any field			
Confidence in ability to inherit land from husband without challenges			7%
Self-reported familiarity with CLCs			
Involvement in dispute over past 3 years			
Contributes to HH agricultural decisions			

Table 13: Summary of Food Security and Women's Empowerment Impact Results by Treatment Group, TOT

Impact Indicator	Agro-forestry	Land Tenure	Land Tenure + Agroforestry
Household Hunger Scale score (0-1 = little to no hunger, 2-3 = moderate, 4-6 = severe)		-0.25	-0.28
Number of months out of the year household experienced hunger			-0.55
Perception that laws adequately protect women's land rights			
Perceived tenure security based on worry about losing rights to land		-0.47	-0.46
Number of assets owned jointly			1.22
Personal ownership of CLC for any field		27%	
Confidence in ability to inherit land from husband without challenges			
Self-reported familiarity with CLCs		59%	59%
Involvement in dispute over past 3 years			
Contributes to HH agricultural decisions			

IMPACT ESTIMATES CHARTS

Figure 16: ITT and TOT impact results, cross-sectional only



The cross-sectional ITT and TOT regression results at follow-on suggest the TGCC Land Tenure intervention did achieve some positive impacts on food security and some indicators of women's empowerment at follow-on, particularly for women from households that had received CLCs by follow-

on (Figure 16). However, the lack of baseline data and imbalance across chiefdoms on some indicators calls for some additional caution with respect to interpretation.

For the food security indicators, TOT results suggest that TGCC's interventions led to an average decrease in the Household Hunger Scale (HHS)⁷⁵ score of 0.25 or 0.28 points over the control group mean (significant at $p < 0.05$), for CLC-holding households in the Land Tenure or joint Land Tenure + Agroforestry treatment groups, respectively, although average scores are low across all treatment groups and equate to most households experiencing "little to no hunger" on the HHS scale.⁷⁶ The joint Land Tenure + Agroforestry intervention also led to a 0.55 reduction in the number of months a household experienced hunger, on average, for CLC-holding households in that treatment group. However, these results could be driven by an imbalance on food security indicators that is present across treatment arms and more pronounced for the TOT analysis. For both of these indicators, impacts were smaller and not significant for the ITT analyses, which includes all households in the Land Tenure or Land Tenure + Agroforestry treatment groups regardless of whether they had obtained a CLC by follow-on. Although the follow-on data indicates that moderate or severe hunger were relatively uncommon at follow-on, these effect sizes are fairly large in real terms given the control group mean HHS and the mean number of hunger months experienced was 1.22 months.

For the women's empowerment indicators, the TOT analysis suggests the TGCC Land Tenure intervention led, on average, to a 0.47 or 0.46 point reduction in wives' rating of their perceived tenure insecurity,⁷⁷ among CLC-holding households in villages that received the Land Tenure or Land Tenure + Agroforestry interventions, respectively (significant at $p < 0.01$). The magnitude of impact is smaller for the ITT approach and not significant. Results also suggest that TGCC's joint Land Tenure + Agroforestry intervention led to a 1.22 unit increase in the number of assets wives' from CLC-holding households said they owned jointly (significant at $p < 0.01$), over a control group mean of 5.0 assets.

With respect to women's empowerment indicators that were assessed as binary measures, TGCC's Land Tenure intervention led to a 27.4 percent increase in the likelihood the female primary decisionmaker in the household personally has a CLC as documentation for land used by the household (significant at $p < 0.05$), among CLC-holding households. TGCC also led to a 59 percent increase in the likelihood the female primary decisionmaker in the household says she is familiar with CLCs in Zambia, among CLC-holding households in villages that received the Land Tenure or joint Land Tenure + Agroforestry intervention, respectively (significant at $p < 0.001$). The magnitude of impact is much smaller and no longer statistically significant for the ITT approach, which also includes households in these treatment groups that had not received a CLC by follow-on. The implication is that having a CLC in the household plays a role in improving women's familiarity with the document.

The results do not find evidence for an impact of the TGCC interventions on wives' belief that land laws adequately protect women's rights, confidence she will inherit her husband's land, the number of years she feels comfortable leaving land fallow without worrying about losing her rights to the land, the likelihood she has some agricultural land solely her own or the likelihood she feels she can provide inputs into agricultural decisions in the household. Across both model approaches for this outcome

⁷⁵ The HHS is a food deprivation scale that measures the percent of households experiencing hunger. The scale takes values from 0 to 6, where 0-1 equates to little to no hunger, 2-3 denotes moderate hunger, and 4-6 corresponds to severe hunger.

⁷⁶ The scale ranges from 1 to 6, with lower scores indicating higher food security.

⁷⁷ The scale ranges from 1 to 4, with lower scores indicating higher tenure security.

family, we find no evidence for impacts on any of the indicators for households that remained in the Agroforestry only treatment group at follow-on.

DISCUSSION

A wives' survey module newly added to the TGCC IE household survey for the 2021 follow-on round of data collection enabled the evaluation to expand its coverage on food security and women's empowerment issues. The main respondent for the household survey is the household head, however a subset of questions in the wives' module were asked separately to both the household head and the primary decision maker of the opposite gender. For example, if the household head was male, this set of questions was asked to both the male household head, and then again to primary adult female decision maker in the household. This is done to enable additional exploration of intra-household differences on selected issues across primary male and female decision makers. For the A-WEAI-derived women's empowerment indicators that we report on, the primary female decision maker in our sample is always the wife of the primary male decision maker answering the same set of questions. For other indicators we report on in this section, as specified above, we summarize responses from the main household survey respondent or the primary female decision maker (in all cases, the spouse of the household head), where applicable.

Because this survey module was not implemented during the 2014 baseline or 2017 endline survey rounds for the TGCC IE, the impact estimates for these indicators are obtained from cross-sectional ITT and TOT analysis of the follow-on 2021 data only, and thus are somewhat less robust. In addition, the TWFE approach, exploratory analysis of differential impacts for households that received the Land Tenure intervention in 2014-15 compared to 2018-19, and subgroups analyses are not conducted for this outcome family, due to the absence of data from previous rounds and insufficient power. This is in contrast to results for the other five outcome families, which are obtained from a panel analysis across baseline, endline and follow-on survey data. The food security and women's empowerment results are also complemented by qualitative findings and descriptive summary statistics.

This section begins with a summary of key descriptive findings on Outcome Family 6 indicators, since they are newly reported for this round. We then turn to discussion and interpretation of the impact results.

SUMMARY OF KEY DESCRIPTIVE STATISTICS AT FOLLOW-ON

Findings from the wives' module of the household survey provide several indications of lower land tenure security for women in the survey sample compared to men. Women in the survey sample are less commonly named on registered land titles or any land documents, while male and female respondents alike are less likely to see women as having a right to sell household land. Men are also more likely than women to express knowledge of their land rights, where to obtain help for land conflicts, and to feel they would have access to representation if a land dispute should arise. There are also large disparities by gender with respect to participation in income-generating activities and economic decisions, but less so with respect to control over income and asset ownership. Male primary decisionmakers in the survey sample access loans at a higher rate and their average loan size (among loan takers) is nearly twice that of female primary decision makers.

FOOD SECURITY

- 90.1 percent of surveyed households suffered from little to no hunger, while 9.9 percent suffered from moderate to severe hunger. The average number of months households reported experiencing hunger was 1.22 months. There were no significant differences in the degree of hunger experienced based on TGCC treatment status. Hunger was unevenly distributed among chiefdoms, and more pronounced in Mkanda and Mshawa.

WOMEN'S LAND TENURE SECURITY AND WOMEN'S CONTROL OVER LAND

- *Possession of a CLC*: Overall, 8 percent (N=58) of wives surveyed reported personally having a CLC as documentation for land used by the household. This proportion varied by treatment group, as expected, and was 11 percent (N=36) or 7 percent (N=22) for wives from households in villages that received the Land Tenure intervention or the joint Land Tenure + Agroforestry intervention, respectively. There was also significant variation by chiefdom. The greatest proportion of wives reporting CLCs was among households from Land Tenure villages located in Mkanda and Maguya chiefdoms, at 16 or 17 percent of those wives' samples, respectively.
- *Familiarity with CLCs*: Among wives surveyed, 33 percent (N=204) said they were familiar with a CLC, and this also varied by treatment group and chiefdom, as expected. Wives' reported familiarity with the CLC was highest among households in Maguya chiefdom, where the average was 58 percent (N=85), and lowest among households in Mnukwa, at 16 percent (N=23).
- *Land disputes*: 15 percent (N=188) of the wives' sample reported having been involved in any type of land dispute in the 3 years prior to survey. The incidence of disputes also varied across chiefdoms, ranging from 12 percent (N=34) in Maguya to 17 percent (N=22) in Mnukwa. The incidence of disputes reported by wives also varied by treatment group. It was lowest for wives from households in villages that received the Land Tenure intervention (14 percent, N=76).
- *Perceived tenure security*: When asked how worried they are that they could lose rights to use any of their fields in the next five years, women's average score was 1.58 (N=1,244), on a scale of 1-4, where a 1 indicated not worried at all and a 4 indicated very worried. Wives' perceived tenure security also varied by chiefdom, and was highest in Mnukwa (mean of 1.83 in Mnukwa, and lowest in Maguya at 1.37). In all cases, the average scores indicate that female respondents feel relatively tenure secure with respects to their fields.
- *Gendered differences in perceived tenure security*: Female decision makers were significantly more likely to say they were not likely to lose rights to any plot within the next five years (79.1 percent of females, 71.9 percent of males), and to say they were not worried about the household losing its rights to any plot over the same time period (78.8 percent of females, 73.0 percent of males). On the other hand, male decision makers were significantly more likely to say the household could leave its land fallow indefinitely and would never lose its land use rights (28.0 percent of males, 14.5 percent of females).

PARTICIPATION IN PRODUCTIVE ACTIVITIES AND ECONOMIC DECISIONS

- Among all plots belonging to sampled households, 69.2 percent were under the primary responsibility of the primary male decision maker in treatment communities, while female primary decision makers were the main person responsible for 29.0 percent of all plots.
- The survey asked male and female decision makers about whether they participated in each of six income generating activities, including food crop farming, cash crop farming, livestock farming, non-farm economic activities, wage employment, and fishing or fishpond culture. On average, female decision makers participated in 2.8 activities, compared to 2.9 activities for male decisionmakers.

CONTROL OVER INCOME

- The evaluation team created an indicator of empowerment in control over income, using the definition from the A-WEAI. Among male and female decisionmakers in treatment communities, 56.0 and 58.5 percent, respectively, met the empowerment in control over income criteria.

ASSET OWNERSHIP

- Drawing from the AWEAI survey, the wives' module at follow-on asked both male and female respondents about household possession of 14 different asset categories. Where households had these assets, respondents were asked whether they owned any of each item solely or jointly with their spouse. The evaluation team drew on this information to obtain a count of asset categories for each household where male or female primary decision makers indicated the assets were owned jointly across spouses. At follow-on, the average number of asset categories that were reported jointly owned was 5.6 for females and 6.4 for males. This was the lowest for the control group (an average of 5.0 for females and 5.6 for males) and the highest in the agroforestry and land tenure treatment group for females (average of 5.9 assets) and in the land tenure group for males (average of 6.3 assets). The average number of assets ranged from 5.2 in Mshawwa to 6.3 in Maguya for females, and from 5.8 in Mshawwa to 6.82 in Maguya for males.
- Among households where either the male or female respondent indicated anyone in the household currently has agricultural land (N=389), 24.0 percent (N=93) of male respondents said they solely owned any of that land, while 12.9 percent (N=50) of female respondents said the same. This also varied by chiefdom and treatment, with 12.9 percent of females in the agroforestry and land tenure households to 23.7 percent of females in control households reporting that they solely owned agricultural land. This compares to a low of 31.5 of males in land tenure households to a high of 43.3 percent in control households. Among chiefdoms, females reported solely owning between 11.4 percent of agricultural land in Mnukwa to 19.1 percent of agricultural land in Mshawwa, while this value for males ranged from 29.3 in Mnukwa to 40.9 in Mshawwa.
- Overall, male decision makers described themselves as personally owning slightly more asset categories (5.6 items) than female decision makers (5.3 items). The difference is statistically significant.
- The evaluation team created an indicator of empowerment in asset ownership, using the definition from the A-WEAI. Among male and female decision makers in treatment communities, 99.0 percent of respondents in each group met the empowerment in asset ownership criteria.

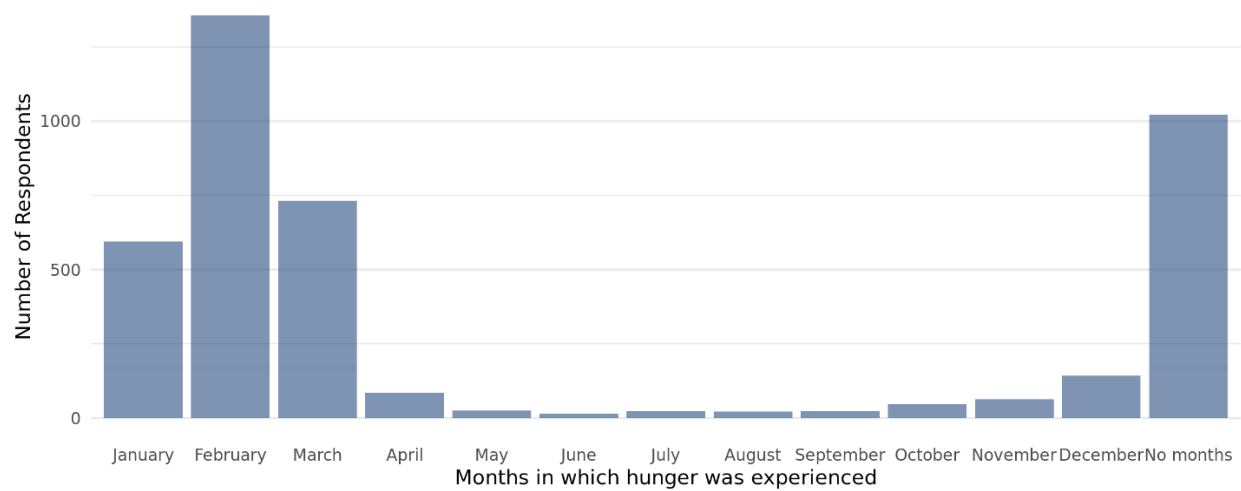
DISCUSSION ON FOOD SECURITY IMPACT ANALYSIS

The impact analysis suggested potential improvement to household food security as a result of the TGCC programming, though results should be interpreted with caution given that there is imbalance on hunger indicators across chiefdoms. Descriptive summary statistics from the household survey at follow-on indicated the lean season begins for many households in January, is most severe in February, and continues for some households into March. The majority of respondents (60.2%; N= 1,552) experienced some level of hunger within the year before the follow-on survey was conducted. Hunger was primarily experienced in during January (23.1% ;N=596), February (52.7%; N=1359), and March (28.3%; N=731) (Figure 17). Outside of these months, hunger averaged 1.9 percent. While it is common for households to experience a lean period during the year, severe hunger was very uncommon at follow-on. According to the HHS scores, 90.1 percent of households (N=2319) experienced “little to no hunger”, 8.6 percent

of households (N=221) experienced “moderate hunger”, and 1.3 percent of households (N=33) experienced “severe hunger.”

Overall, levels of hunger were relatively low at follow-on, which is important to note given that data collection was conducted during the COVID-19 pandemic where there are overarching concerns on potential disruptions to supply chains, labor availability, inflation, and other potential factors that could affect food security in rural areas of Zambia.

Figure 17: Experience of Hunger by Month



The qualitative findings at follow-on provide some support for some potential pathways by which TGCC’s land mapping and CLC provisioning interventions could have affected household’s food security. Perhaps the most salient of these is the strong qualitative evidence across several villages which suggests that many farmers were able to effectively expand the area of land they farmed as result of TGCC’s land mapping, by enabling them to farm up the edge of their fields. Farmers said they felt comfortable doing this as a result of the clarification and agreement on field boundaries they obtained through the intervention, whereas previously they had avoided farming along edges of their fields to avoid potential conflicts with neighboring parcel-holders (see related discussion for OF3). As discussed for OF4, there is also some empirical and qualitative evidence that some farmers are starting to see improved crop yields as a result of their agroforestry investments, which is also anticipated to have knock-on effects for food security in a context where most households in the activity area are subsistence farmers. However, it is not clear that these impacts are sufficient to obtain the magnitude of change on food security that is observed through the TOT analysis. It is possible that higher levels of hunger in Mshawa could also be driving these results to some extent.

WOMEN’S EMPOWERMENT

Gender norms and traditions related to marriage heavily influence the customary system of land allocation in the TGCC activity area, as well as decision-making over household income, farming activities, and selling land. In FGDs, women highlighted that most women who left their home village to get married joined their husband but only had rights to the land through their husband. If a married woman got divorced or became widowed in a village she was not originally from, she would have to

return home with her children. Many widows or divorced women returning home faced difficulty obtaining family land that had been redistributed in her absence. However, with the introduction of CLCs, female children are also now entitled to their parents' land.

Although the follow-on impact analysis points to a significant increase in women's possession of a CLC, the descriptive statistics highlight a significant gender gap in the level of familiarity with CLCs. One-third (32.6 percent; N=202) of primary female decisionmakers stated they were familiar with CLCs, compared to almost half (46.1 percent; N=524) of primary male decisionmakers.

The qualitative findings at follow-on highlight that women feel that decision-making over farming is often shared, although decisions over land purchase, sale or transfer still often rest with the primary male household head. FGDs held with men also indicated that many men engaged some form of joint decision-making about farming with their wives. However, it was also clear that persisting gendered norms around women's (lack of) rights to land are still common.

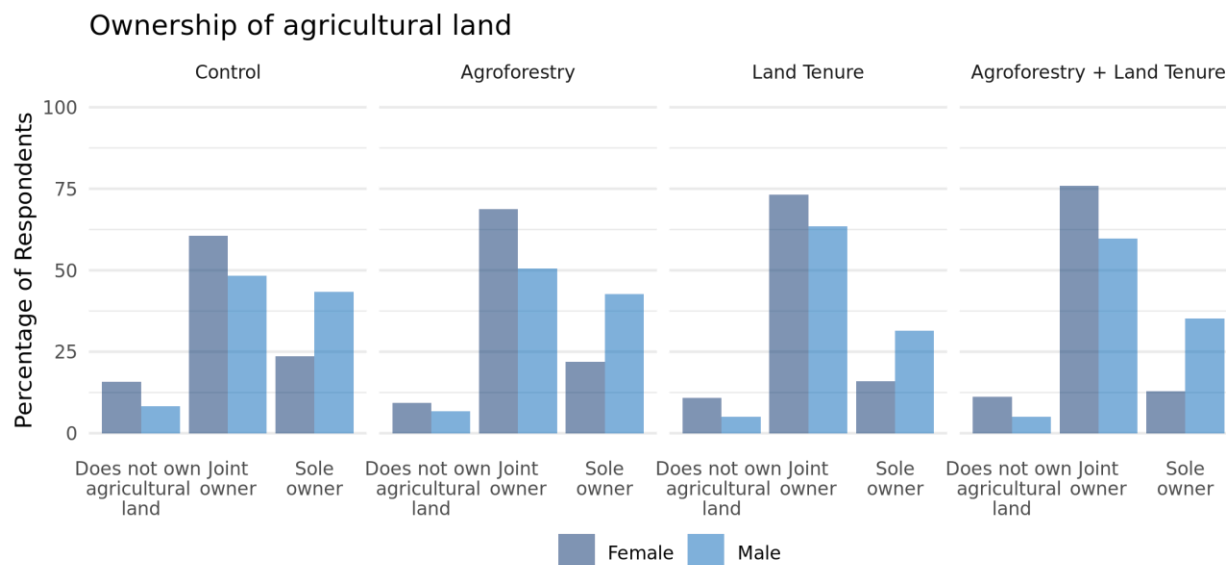
While many respondents promoted joint decision making around farming decisions and how to spend income from farming, decisions around owning or inheriting land were much more gendered (male dominated) because of the persisting patrilineal structure of inheritance. Women who marry typically move to their husband's village⁷⁸ where they traditionally did not have rights to own their own land under customary norms. Instead, their primary means of obtaining land was traditionally via inheritance from their own father's lineage in their village of origin.

“These women we marry are the ones that are disadvantaged because only me, my brothers and my parents are the ones that makes decisions on land. It becomes difficult for them to participate they have no space.”
(Male FGD respondent, LT+Ag, Mshawwa)

Moreover, it was uncommon in the qualitative data collection for female respondents to report owning land separately from husbands or family members. For most who owned land it was jointly owned either with their husband or children (with all parties listed on CLCs). The outlook on this from the wives' survey descriptive statistics aligns with this but is also somewhat more encouraging. Although a larger proportion of women than men said they did not own any agricultural land, irrespective of treatment group, the proportion of women claiming joint ownership of land is highest in Land Tenure and Land Tenure + Agroforestry treatment groups (Figure 18).

⁷⁸ Noting that one of the four chiefdoms, Mkanda, is traditionally matrilineal while the other three are patrilineal. However, we do not see strong differences in patterns of outcomes or qualitative responses from women on related issues, in Mkanda relative to the others.

Figure 18: Ownership of Agricultural Land by Treatment Group and Gender.



Some participants indicated that the TGCC intervention had helped men to consider alternative viewpoints on women's ownership of land.

"The problems that women go through for example [around obtaining or using land], she can be farming together with her husband if the husband dies the woman will be told to go back to her village and she will not be allowed to have any land. Only the children. But after land mapping, we were told to say even a woman has the right to own land even after the husband dies, she should have her own land." (Male FGD respondent, Lt+Ag, Mnukwa)

"If we were to take a survey, you will find that most vulnerable people in terms of land ownership are women". ... "When it comes to property, there has been exclusion in terms of land sharing regarding the sex of the child. Meaning that these people, they have to be addressed or to be sensitized, so that this [practice] can come to an end." (Male KII respondent, LT, Mshawa)

Women FGD participants from some Land Tenure villages confirmed that their situations had improved since the TGCC land mapping activity. In other FGDs, women described that while patrilineal land inheritance norms have not changed as a result of CLCs, the inclusion of women on the CLC had helped to protect them from losing land that they have a right to in their village of origin. So, when women are widowed or divorced and move back to their village of origin, if they have CLCs, they feel they will be able to defend their right to land they inherit there.

While the qualitative findings suggest that CLCs have not altered customary norms around land inheritance, FGDs with men and women from several Land Tenure villages indicated the CLCs are perceived to have improved women's ability to retain rights to land they are given by husbands as well as protect their rights to land in their village of origin. The results on this are mixed, however, with respondents from a similar proportion of FGDs saying that nothing had changed with respect to women's land tenure and land challenges as a result of the TGCC intervention. The quotes below, from villages where CLCs were distributed, illustrate some aspects of change and persisting biases.

“In an event that the husband dies and then family decides to grab property, the CLC can protect them [women].” (Male FGD respondent, LT+Ag, Mnukwa)

“On the Customary Land Certificate, it is written Mr and Mrs, so if a man troubles you, you just get the Customary Land Certificate and go to report to the palace. Sometimes we just approach the headman and register the complaint that, “look my husband is not allowing me to cultivate on our land. Now, if he cannot allow me his wife to cultivate with him, who is he going to cultivate with?” So, because of that, things have changed. Everything now is fine.” (Female FGD respondent, AG+LT, Mkanda)

“If they want to sign a CLC, it is a man who signs. So women usually do not have the right to say that she wanted to use a portion of land to plant certain crops. The man is the one who has a lot of say over the land because he is the one at the fore front. [...] Women have no dominion to inherit land.” (Male FGD respondent, LT+Ag, Mnukwa)

The qualitative findings at follow-on also underscored several gendered differences that the literature suggests are common in customary land systems. Among these, many single women in the FGDs reported having smaller plots of land than men or married women who shared plots with their husbands. Women also reported having less support and strength than men to cultivate the same number of crops. Respondents did not report growing different crops according to their gender, nor did they report that plots varied by gender in terms of distance from home or how arable they were. Reported differences were related to size and access to labor.

INTIMATE PARTNER VIOLENCE

At follow-on the evaluation team also tested for impacts of TGCC programming on IPV outcomes⁷⁹, as indicated by wives’ reported experience of different forms of IPV. The analyses draw on the 2021 cross-sectional follow-on data and estimates the probability of wives’ experiencing any form of IPV. The data are drawn from a Demographic and Health Survey gender-based violence module that was incorporated into the wives’ survey at follow-on. The module asked about wives’ knowledge and attitudes regarding IPV, and whether they had experienced any of several controlling behaviors and forms of emotional, physical and sexual violence in their relationship with their husband or partner.

The analysis sought to test whether there was an association between any of the TGCC interventions and wives’ probability of experiencing IPV. This learning interest was incorporated into the follow-on IE to contribute to learning on whether strengthening women’s land rights and possession of land documentation within households could lead to a change in her risk of experiencing IPV. According to the most recent Zambia Demographic and Health Survey, conducted in 2018, 36 percent of women between the ages of 15 and 49 percent have experienced a form of physical violence at least once, while 47 percent of ever-married women experienced some form of emotional, physical or sexual violence by their current or most recent partner.⁸⁰ It is possible that TGCC’s work to strengthen women’s land rights and promote joint certification of land among husbands and wives within households could lead to a reduction in women’s risk of IPV. However, researchers have also posited in other contexts that

⁷⁹ [According to the World Health Organization](#), IPV refers to any behavior within an intimate relationship that causes physical, psychological or sexual harm to those in the relationship, and can include acts of physical violence, sexual violence, emotional abuse or controlling behaviors.

⁸⁰ [2018 Zambia Demographic and Health Survey](#).

efforts to improve women's land rights and equitable access to land could inadvertently increase some women's risk of IPV.

The follow-on descriptive statistics show that the prevalence of IPV among the TGCC villages is similar, if slightly lower, to national statistics on the same for Zambia. Overall, 40.6 percent (N=269) of the 662 wives surveyed at follow-on reported experiencing any form of IPV. Emotional forms of violence were much more commonly reported than physical or sexual violence. The most commonly reported forms were controlling behaviors, in which wives reported their partner or spouse became jealous or angry if she talked to other men (41.1 percent of wives surveyed, N = 270), or insisted on knowing where she is at all times (44.7 percent of wives surveyed, N=295). The most common form of physical or sexual violence reported was being slapped, reported by 23.1 percent of wives surveyed (N=153).

The prevalence of IPV was slightly higher among wives in Mshawa (44.9 percent, N=87), relative to the other three chiefdoms, but the differences in IPV prevalence across the chiefdoms were not statistically significant. The reported prevalence of IPV was lowest among wives in Mnukwa (35.3 percent, N=53).

The ITT impact analyses conducted at follow-on did not find evidence that any of the TGCC interventions led to a statistically significant change in the probability of wives experiencing any form of IPV, relative to the control group probability of 44.2 percent.⁸¹ Further restricting the sample among households in the Land Tenure or Land Tenure + Agroforestry groups to only those households that received the CLC does not change the pattern of results. Among this reduced sample of 301 households, 40.9 percent of wives surveyed (N=123) reported any form of IPV. The cross-sectional analysis of TOT impacts at follow-on again does not find evidence for a statistically significant impact of the TGCC programming on the probability of experiencing any form of IPV over the control group probability of 44.2 percent.⁸² In other words, there is also no evidence for an association between a household's possession of the CLC and the probability of wives experiencing any form of IPV.

CONCLUSIONS

Nearly seven years after the start of TGCC implementation, the follow-on IE establishes several longer-term impacts of the TGCC interventions and provides important evidence-based learning on a range of household-level impacts and issues related to customary land governance within communities. The findings also help to refine key elements of the anticipated theory of change for the land tenure and agroforestry interventions and provide insights into how donor-supported programming can continue to strengthen and build sustainability for these processes over the longer term.

The results are likely most applicable to similar customary and rural smallholder agricultural contexts in Zambia and degraded agricultural landscapes elsewhere in sub-Saharan Africa. They may also be particularly relevant in country contexts where governments are revising land policies and laws to more formally recognize and document customary land rights, and in program contexts where there is an opportunity to consider how land and resource governance activities can contribute to achieving natural climate solutions and related development objectives.

⁸¹ The marginal effects for the ITT analysis are close to zero for each treatment arm and p-values range from 0.21 to 0.36.

⁸² The marginal effects for the TOT analysis are also close to zero for each treatment arm and p-values range from 0.16 to 0.85.

The follow-on IE provides evidence of several impacts that were either sustained, grew over time, or newly emerged during the four years since the conclusion of the initial TGCC programming and endline IE in 2017. Substantial positive impacts on households' tenure security that had started to take hold by the 2017 endline were sustained over the follow-on period. New impacts at follow-on were observed for several indicators of improved land governance within communities, agroforestry uptake, and (to a lesser extent) on improved agricultural production as a result of agroforestry.

At follow-on, there is now evidence of a clear link between TGCC's land tenure interventions, beneficiaries' stronger tenure security over their farms and confidence in land governance in their communities, and an increase in farmers' adoption of agroforestry on their farms. This finding speaks to a core motivation for the IE, which was to obtain learning on whether strengthening smallholders' tenure security via the TGCC land tenure activities incentivizes farmers to adopt agroforestry on their farms. The IE provides strong evidence that it does, in the TGCC program context, while also suggesting that these impacts can take substantial time to develop. Agricultural productivity and other benefits to farmers from agroforestry take even longer to accrue. Despite this, the results provide evidence that impacts on agroforestry uptake can continue to grow over time, as farmers' confidence in their tenure security takes hold, and that these impacts are sustained well after the agroforestry interventions have concluded. This has positive implications for improving farmers' soil fertility and agricultural productivity over time.

However, farmers do still experience technical challenges establishing agroforestry trees, and the number of trees that farmers plant and are maintained over time varies substantially across farms and likely depends on several other factors as well, such as farm size and type of crops grown on the field. Still, 41 percent of households reported having agroforestry trees on at least one of their fields at follow-on. Scaled over a larger area, increased agroforestry uptake has the potential to make substantial contributions to broader climate change mitigation and adaptation objectives, in addition to the localized benefits that farmers obtain from establishing agroforestry on their fields.

In addition to establishing impacts, the IE provides important insights into the mechanisms by which impacts were obtained. The findings confirm several aspects of the underlying theory of change connecting customary land documentation and land governance strengthening to positive development impacts. The IE provides strong evidence that TGCC's land tenure interventions strengthened households' tenure security and land governance within communities. In turn, sustained tenure security impacts helped to motivate households to adopt agroforestry on their fields.

The key mechanisms for positive tenure security and land governance impacts were: (1) Participatory land mapping clarified farm boundaries and reduced the likelihood of boundary disputes among neighbors; (2) Customary Land Certificates were seen to protect landholders from losing land against their will, especially to community outsiders, and made it easier to resolve land disputes; (3) Village Land Committees that were established and strengthened by the program became trusted by villagers to fairly arbitrate land issues in their communities. These same processes served as key mechanisms for greater agroforestry uptake: Land mapping and receipt of the CLCs strengthened farmers' sense of ownership over their land and confidence their rights will be maintained into the future. This strengthened farmers incentive to plant agroforestry trees on their farms, given they would not obtain soil fertility and agricultural productivity benefits from the trees for several years.

However, the follow-on results also highlight that **TGCC’s programming on its own, two to five years after household receipt of participatory land mapping, CLCs and related governance interventions, was not sufficient for achieving major changes to households’ livelihoods or women’s empowerment.** These results suggest a strong need to revisit the intended theory of change for these elements. TGCC had notable impacts on women’s possession of documented land rights and familiarity with CLCs in the Zambian context. The observed gains are important given women’s historical vulnerabilities to land expropriation in the Zambian customary context. But, substantial gendered gaps at follow-on persisted for women beneficiaries relative to men on many key issues. This included on familiarity with the CLC, several measures of tenure security, and with respect to decision making control of farms. The qualitative findings also make clear that women still face deep challenges accessing and inheriting land, and remain vulnerable to losing land through family disputes, as a result of entrenched cultural norms.

The IE finds evidence that the TGCC program made progress on reducing some of those barriers, but more work is needed. Results from the wives’ survey at follow-on also suggest a lack of impact on several aspects of wives’ views about the extent to which laws protect her rights, her confidence in inheriting her husband land, her possession of land in her own name and measures of her tenure security. However, the follow-on IE results do not find evidence that customary land certification leads to an increase in gender-based violence/intimate partner violence, which had been raised as a potential concern. On net, the findings in this domain suggest a strong need to consider how future customary land mapping, certification and governance programming can do more to ensure more substantive and equitable impacts for women. Despite TGCC’s mixed results on this, the findings deepen the knowledge base on efforts to strengthen women’s rights and access to land in the Zambian customary system and similar rural customary contexts.

Results contribute to informing USAID strategy and programming in land and related sectors in Zambia, and in similar country contexts elsewhere. Systematic mapping and documentation of customary land within chiefdoms is envisioned to help the Government of Zambia to achieve its land reform goals, including objectives to improve access and tenure security over land. The TGCC activity was an important pilot of this process that may inform ongoing considerations around movement towards a corresponding national program to issue land documentation to users of customary land in the country. The follow-on IE provides insights into the potential benefits of this for households and communities within Zambia’s customary system, and timelines that may be required to achieve them. It also identifies key elements that will likely need additional support and companion programming to achieve intended objectives, most notably around obtaining more substantive impacts for women within households, sustaining governance achievements over time and eliciting livelihoods improvements.

Finally, **the mixed methods randomized design for the impact evaluation strongly contributed to the evaluation’s ability to provide rigorous evidence and learning on TGCC’s impacts.** Randomized controlled trial (RCT) IE approaches are uncommon in the land sector, can take additional time to develop, and generally require strong buy-in and collaboration from program implementers and other stakeholders. Although this can be challenging to obtain, the rigorous and well-powered IE design and observed magnitudes of effects substantially strengthen confidence in the results.

The RCT approach also provides some additional protection for the evaluation investment, given that programs often face unexpected challenges and do not always roll out as intended. An important caveat for the TGCC IE is that changes among chiefs' support for the CLC and related land governance elements over time led to uneven implementation of the program across chiefdoms, such that beneficiaries from some villages did not receive all of the intended services. This included the customary land certificate document and the full level of land governance support that was initially planned. This variation likely weakened the signal of impacts for some of the outcomes that were analyzed and also introduced some complexity into the impact analysis and power to detect certain results. But, the randomized assignment of villages to the different interventions substantially helped to mitigate this issue and maintain the evaluation's ability to rigorously measure program impacts. On net, the trajectory of results suggests we might expect the magnitudes of impacts to be stronger had all of the villages received the full land tenure intervention and final CLC document as planned.

The RCT design also allowed more flexibility to add learning interests over time and measure TGCC's impacts on them with confidence, as was done for follow-on with respect to several elements of women's empowerment. The IE results are also substantially strengthened by companion qualitative data collection, which in most cases strongly corroborated the impact and statistical results and provided key additional insights into the reasons and mechanisms for change, as well as reasons for lack of impacts for some outcomes.

RECOMMENDATIONS

The key findings and conclusions point to the following recommendations for future programming.

FOR USAID AND FUTURE IMPLEMENTING PARTNERS REGARDING CUSTOMARY LAND FORMALIZATION PROGRAM DESIGN AND EVIDENCE-BASED LEARNING

- *Future programs should explicitly focus on designing and implementing new companion strategies that aim to achieve more substantive gains on women's land rights, tenure security and empowerment as part of their core land tenure programming.*

The IE results find that TGCC's focus on joint titling within households and awareness raising on land laws and rights within TGCC villages were not sufficient on their own to achieve strong gains on women's land rights, tenure security and empowerment. There is a strong need to revisit the intended theory of change for these elements, review and specify key constraints to achieving a range of desired outcomes for women, and incorporate new elements of programming into core land tenure interventions that explicitly aim to address these. It is clear that additional support and more targeted programming to overcome social and cultural biases are needed to help break down persisting gendered norms about women's land rights and achieve more substantial improvements on these issues. Future programs should consider a range of targeted gender programming and additional strategies that can be coupled with customary land mapping, certification and governance programming to ensure more substantive and equitable impacts for women. The work to identify potential interventions and strategies that may be a good fit for a given program context should be done in the lead up or during an activity design phase, through a widely consultative process, and draw on the existing evidence and knowledge base with respect to the context fit and potential effectiveness of a range of potential strategies that have been tested in comparable settings to achieve equitable gains for women.

- *Future programs should plan for sustained support to Village Land Committees during the program lifetime and to sequence some form of local institutional land governance support beyond the initial 3-5 year program cycle, to help ensure that land governance gains are sustained over time.*

The follow-on results pointed to important land governance gains within TGCC villages that were not observed four years earlier, but also raise concerns on whether these improvements will continue to be sustained into the future. Where VLCs were still active at follow-on, they played an important role in improving land governance in communities, mediating land disputes and helping to sustain tenure security gains among households. But, the results also show that VLCs are no longer active in a substantial proportion of villages, or their capacity to conduct their activities may be declining. Given the substantial investment into their establishment and that they are a new local institution, it may not be realistic to expect these committees to be able to maintain their functions without some level of external support so soon after their establishment. Program support for newly established land governance institutions within communities should plan to take place over a time frame that extends beyond short-term (3-5 year) program support. Program implementers may also consider a strategy that concentrates resources and support into a smaller number of potentially higher capacity institutions, although this model could also lead to some trade-offs around local buy-in and uneven support or service delivery across different communities.

- *Consider sequencing support for the customary land administration system into the future, so that the system TGCC helped to develop and capacity within CDLA and related institutions can remain functional over time, and households that received CLCs can access related land administration services as needed.*

At follow-on, less than half of respondents who had received a CLC said they had enough information about how to make updates to the CLC if they needed to. Given that TGCC was operating in the absence of an established customary land administration system by government, it is understandable that the program was not able to fully address this component during the activity lifetime. However, the district land alliances appear logically positioned to provide this support. Currently, the demand to make updates to the CLCs appears to be fairly low among those who received the document. However, and since this is expected to change over time, future programs should prioritize providing the necessary support to develop or strengthen this system within an appropriate local institution, and the capacity to help ensure it remains functional over time. This may also require sequenced support that extends beyond a typical 3-5 program cycle.

- *To help sustain agroforestry uptake, consider building refresher trainings or follow-up technical extension services on some interval after the conclusion of the initial support.*

The IE found evidence that TGCC led to increased agroforestry uptake, and gains on this continued to take place well after program completion. The results suggest that additional support aimed at strengthening farmers' technical knowledge on agroforestry could help to further increase uptake and agroforestry seedling and tree survival. Some of the particular issues that respondents mentioned included not knowing how to protect seedlings from pests, whether the trees are better to plant on maize or groundnut fields, and constraints around accommodating agroforestry trees on very small fields.

ANNEX A: QUALITATIVE INSTRUMENTS AT FOLLOW-ON

GROUP DISCUSSION AND KEY INFORMANT INTERVIEW INSTRUMENTS: CEL FOLLOW-ON IMPACT EVALUATION OF THE TENURE AND GLOBAL CLIMATE CHANGE (TGCC) ACTIVITY

[Version of 23 Aug 2021]

Prepared by NORC at the University of Chicago

USAID Communications, Evidence and Learning (CEL)

GROUP DISCUSSION SAMPLE BY CHIEFDOM: 64 GDS IN TOTAL

GD PROTOCOL CATEGORY	MNUKWA	MSHAWA	MKANDA	MAGUYA
Women	1 GD per village x 8 villages = 8 GDs	1 GD per village x 8 villages = 8 GDs	1 GD per village x 8 villages = 8 GDs	1 GD per village x 8 villages = 8 GDs
Men	1 GD per village x 8 villages = 8 GDs	1 GD per village x 8 villages = 8 GDs	1 GD per village x 8 villages = 8 GDs	1 GD per village x 8 villages = 8 GDs
	Total: 16 GDs	Total: 16 GDs	Total: 16 GDs	Total: 16 GDs

KEY INFORMANT INTERVIEW SAMPLE BY CHIEFDOM⁸³: 16 GROUP KIIS IN TOTAL

KII PROTOCOL CATEGORY	MNUKWA	MSHAWA	MKANDA	MAGUYA
Group KII with landless individuals	1 KII per village x 2 villages = 2 KIIs	1 KII per village x 2 villages = 2 KIIs	1 KII per village x 2 villages = 2 KIIs	1 KII per village x 2 villages = 2 KIIs
Group KII with other non-participants in land mapping and CLC registration	1 KII per village x 2 villages = 2 KIIs	1 KII per village x 2 villages = 2 KIIs	1 KII per village x 2 villages = 2 KIIs	1 KII per village x 2 villages = 2 KIIs
	Total: 4 Group KIIs	Total: 4 Group KIIs	Total: 4 Group KIIs	Total: 4 Group KIIs

Village sample notes:

- Villages for qualitative data collection will be selected purposefully by the NORC evaluation team.
- Qualitative GD and KII data collection will take place in a total of 32 villages:
 - 8 villages per chiefdom. In each chiefdom, the 8 villages will be divided as follows:
 - 6 villages that were part of TGCC implementation during 2014-2016, where most or all villagers received either land mapping services and customary land certificates (CLCs) (LT – 2 villages); agroforestry services (AG – 2 villages); or a combination of both (LT + AG – 2 villages).
 - 2 villages that served as a control group during 2014-2016, where villagers either did not receive land mapping services and CLCs, or did so more recently during 2018-2021.
- 2 GDs will be held in each of the 32 villages according to the schedule below.
- 1 group KII will be held in each of four TGCC villages per chiefdom selected for qualitative data collection, per below.
 - No group KIIs will be held in each of the two qualitative villages per chiefdom that served as control villages during TGCC implementation in 2014-2016.

Example: Chiefdom #1

⁸³ Group KIIs of 1-4 individuals together will be completed if/as such households are available in a selected village. Group KIIs can be a mix of men and women.

	Village 1 – TGCC during 2014-2016 (LT)	Village 2 – TGCC during 2014-2016 (AG)	Village 3 – TGCC during 2014-2016 (LT + AG)	Village 4 – control village during 2014-2016	Village 5 – TGCC during 2014-2016 (LT)	Village 6 – TGCC during 2014-2016 (AG)	Village 7 – TGCC during 2014-2016 (LT + AG)	Village 8 – control village during 2014-2016
GD #1	Women	Women	Women	Women	Women	Women	Women	Women
GD #2	Men	Men	Men	Men	Men	Men	Men	Men
Group KII #1 – landless individuals	✓	No	No	No	✓	No	No	No
Group KII #2 – other non- participants in land mapping and CLC registration	No	No	✓	No	No	No	✓	No

INTRODUCTION AND CONSENT: GROUP DISCUSSIONS

The Moderator should read the following consent script prior to the start of the group discussion:

Introduction

Hello, my name is _____. I am a researcher working with Palm Associates, a local data collection firm. We are conducting a study about agroforestry and land tenure in Zambia's Eastern Province. This work is funded by the U.S. Agency for International Development, and is being conducted by an NGO in the US called NORC. I would like to ask you some questions to better understand your experience with agroforestry and land tenure. Your participation is entirely voluntary. This conversation will be recorded by a digital voice recorder so we can be sure to capture all the information accurately. This village was previously visited for this study, and we wanted to follow up with you now.

What will I do if I choose to be in this study?

Participants in these group discussions are invited to participate because you live in one of the randomly selected villages in the study, and because you are a member of a group of interest for better understanding how agroforestry and land tenure issues might affect different groups of people in different ways.

If you agree to be part of the research study, you will be asked to participate in a focus group discussion about agroforestry and land tenure activities in your village. The discussion will last about 60 minutes. At any time, you can decide to stop being part of this discussion. If you choose to stop being part of the study, we will not ask you any more questions, but we will keep the answers you've given us unless you tell us otherwise.

What are the possible risks or discomforts?

Being part of this study does not involve any risks to you that are different than what you would experience day to day. Participation in this study will involve no cost to you.

What are the possible benefits for me or others?

You will receive a small compensation equivalent to K30.00 ZMW for your participation. You will not get any direct benefit from being in this research study beyond this. However, we hope that this study will help provide researchers and political leaders with a better understanding of the resources used and needed in Zambia.

What are my rights as a research participant?

We will respect any decision you make about answering any questions. You are free to stop being in the study at any time. You can also refuse to answer any questions at any time. Choosing not to be in this study or to stop being in this study will not have any bad consequences for you.

What about my confidentiality and privacy rights?

The responses from this focus group will be combined with those from other focus group discussions, which will include around 250 other people in total. Only general results will be reported, and no information will be reported which could be used to identify an individual or village.

We tell all participants that comments made during the focus group session should be kept confidential. However, it is possible that participants may repeat comments outside of the group at some time in the future. Therefore, we encourage you to be as honest and open as you can, but remain aware of our limits in protecting confidentiality. To protect your responses, we ask that you do not share the details of the discussion outside of the focus group session. All personal information will be encrypted and stored electronically to keep it safe. Information from this discussion may be used for research articles; however, we will not discuss your individual results. Your responses will be combined with those from approximately 30 other villages. Only general results will be reported, and no information will be reported which could be used to identify you or your village.

Who should I call if I have questions or concerns about this research study?

If you have questions about this survey, you may contact [NAME] at Palm Associates. You may also contact the Biomedical Research Ethics Committee Chairperson via phone at [NUMBER]. If you have questions about your rights as a research participant, you may call the NORC Institutional Review Board Manager at [Number].

Do you have any questions for me?

Do you agree to participate in this research? _____ Yes _____ No

Participant's Name (printed) and Signature/Thumbprint _____ Date _____

Name (printed) and Signature of Person Obtaining Consent _____ Date _____

Village ID _____

[START THE RECORDER TO GET VERBAL CONSENT]

Do you agree to participate in today's discussion?

[IF YES, CONTINUE DISCUSSION]

May we begin?

[Facilitator: Remember to fill out the FG participant form and note-taking form for each GD conducted].

GD PARTICIPANT REGISTRATION FORM:

Focus Group Respondent Category (select one gender and one TGCC Village Status):						Moderator: _____ Note-taker: _____ Start time: _____ : _____ AM/PM (circle one) End time: _____ : _____ AM/PM (circle one)		
☐ Women ☐ Men								
☐ TGCC Land Tenure Village (LT) ☐ TGCC Agroforestry Village (AG) ☐ TGCC Land Tenure + Agroforestry Village (LT + AG) ☐ TGCC Control Village								
Village Name:		Chiefdom Name:		Month: _____		Day: _____ , 2021		

Partici pant	Main Occupation (farmer, shopkeeper, teacher, etc)	Gender (M/F)	Age	Marital Status (Married, Traditional Marriage, Single, Co-habitation, Widowed, Separated, Divorced)	Education level completed	Has a CLC (Y/N)	Area of land owned by household (Hectares)
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							

	9.							
	10.							
	11.							
	12.							
	13.							
	14.							
	15.							

Facilitator: Has land mapping and registration been conducted by CDLA in this village? YES / NO (If YES: what Month and Year?: _____)

Facilitator: Have CLCs been distributed to anyone in this village? YES / NO (If YES: what Month and Year?: _____)

Comments on any aspect of the GD:

GD PROTOCOL

TGCC IE FOLLOW-ON STUDY

This guide should be used for all GD respondent categories (male and female; any TGCC village status).

We would like to talk with you about your experiences with land in this village and Customary Land Certificates (CLCs), including experiences you may have had with a USAID project known as the Tenure and Global Climate Change (TGCC) project. The TGCC project mapped and documented land rights in some villages in Chipata District, and provided villagers with Customary Land Certificates (CLCs). This project was implemented by the Chipata District Land Alliance and some other partners during 2014-2020. In some villages, the project also partnered with an agroforestry program through COMACO, to encourage tree planting on farms.

Opening Question: Do you know of the USAID TGCC project? Can you briefly describe what it did?

A. PARCEL MAPPING AND DEMARCATION; CLC RECEIPT AND UPDATING

1. How many people here in this group participated in land mapping for any fields or parcels of land that you use in this village? How many of you have obtained a customary land certificate for any of those fields or parcels? (May I see a show of hands?) *[Facilitator, confirm familiarity with CLCs with the group and provide explanation as needed]*
 - a. Probe: What year was your land mapped? What year did you receive your CLCs?
 - b. Probe: Did you encounter any challenges related to participating in land mapping? Obtaining a CLC? What are some examples of the main challenges you encountered? How were these resolved?
2. Was everyone who wanted to participate able to, or were there some people who have land in this village who were not able to have their land mapped? Was everyone who wanted to able to receive a CLC? (Follow-up: Is there anyone here in this group who was not able to participate? How many people? May I see a show of hands?)
 - a. Probe: What were the main reasons some people were not able to participate in mapping and related processes? To obtain a CLC?
3. Has anyone here in this group made any updates to your CLCs after you received the CLC? For example, to register a change in ownership or land transfer, in case of death or divorce, or any other updates? (Follow-up: How many people here have made changes to your CLC? May I see a show of hands?)
 - a. Probe: If yes, what kind of changes did you make to your CLC, and what process did you follow?
Was the process to update your CLC easy to follow?
 - b. Probe: If yes, did you encounter any challenges? How were these resolved?
 - c. Probe: If no, for people here in this group who have not yet made any changes or updates to your CLC, do you know what to do if you need to make a change to your CLC? What process are you aware of to make updates to the certificate? Do you feel confident that you could make updates to the certificate if you needed to? Why or why not?
4. Has anyone here used the village register or village land maps that were established to document land rights for this village? Why or why not?
Probe: Do you think the register or maps can help to protect your land rights? Why or why not?

B. LAND GOVERNANCE, DISPUTES, TENURE SECURITY

Earlier, we learned about some of the common types of disputes over land in this district and different types of challenges for men and women who have land here.

1. What are the biggest challenges that currently exist for you with respect to your rights to land in this village?
 - a. *Probe:* How is land currently allocated in this village?
 - b. *Probe:* What are the most common types of land disputes that people here in this village experience?
 - c. *Probe:* How do you normally try to resolve such disputes? Are you satisfied with the dispute resolution options available here in this village? Why or why not?
2. In what ways do you think the CLC can help to protect your land rights? Against what types of disputes or threats?
 - a. *Probe:* Are there any types of land disputes or risks to losing your land that you think the CLC could not help you with? Why?
3. If someone from outside the community, such as investors or someone from government, tried to take over some of your land, do you think the CLC would help to protect you from this? Why, or why not?
4. To your knowledge, does your village currently have a Village Land Committee?
 - a. *Probe:* What year was the Village Land Committee formed?
 - b. *Probe:* What types of activities does the Village Land Committee do, to your knowledge?
 - c. *Probe:* Does the Village Land Committee play any role in land allocation in this village? If yes, please explain how.
 - d. *Probe:* How satisfied are you with the way that the Village Land Committee is supporting customary land in this village? Please explain why.
 - e. What else do you think would be needed to support the Village Land Committee to function? To strengthen the Village Land Committee's ability to support customary land here in this village?

C. BENEFITS OF CLCS

We are interested in learning about any benefits, challenges, and changes you may have made in how you use your land since obtaining a CLC. [Facilitator: Ask remaining questions in this section only if any GD participant has a CLC]

1. For those here in this group, what are the main ways you feel you have benefited from having a CLC, if at all?
 - a. If you do not feel you have benefited from having a CLC, what are the main reasons why?
 - b. Are there any negative things that have happened to you as a result of having a customary land certificate?
2. Are there any ways that having your land mapped and receiving the CLC has helped you to expand your economic activities, increase your farm yields, or your income?
 - a. What else would be needed to help you achieve this?
3. Have you made any changes to the type of crops you grow, or other changes to your farming practices, since you had your land mapped and obtained a CLC?
 - a. What types of changes?

- b. Has this led to any changes in yields or the income you receive from farming? Why or why not?
 - c. If you haven't made any changes to your farming practices, what are the main reasons why?
- 4. Have you made any investments on your land since you received a CLC, like installing irrigation, putting up a permanent structure, or buying farming equipment?
 - a. What types of changes?
 - b. Has this led to any changes in yields or the income you receive from farming? Why or why not?
 - c. If you haven't made any changes to investments on your land, what are the main reasons why?
- 5. Have you made any other types of changes or improvements on your land since you received a CLC?
 - a. What types of changes?
 - b. Has this led to any changes in farm yields or income you receive? Why or why not?
- 6. Are there any types of changes you would like to make on your land since receiving the CLC, but have not been able to?
 - a. What are they?
 - b. What are the main reasons preventing you from making those changes?
- 7. Has anyone in this group used their CLC to obtain a loan from any informal lender, formal bank or microfinance institution?
 - a. *Probe:* If yes, from what type of lender? How did the CLC help you to obtain this loan?
 - b. *Probe:* Did you show or provide your CLC as part of the process?
 - c. *Probe:* If no, why not? What are the main challenges that you see in using the CLC to obtain a loan?
- 8. Are there any ways that anyone in this group has used their CLC for any other purpose?
 - a. How did the CLC help you with this activity?

D. AGROFORESTRY

Now we would like to discuss your experiences with tree planting and agroforestry projects here in this village.

- 1. How many people here in this group have planted any agroforestry trees or shrubs on any of your fields, such as musangu, gliricidia, ububa, cowpeas, pigeon peas, or others?
 - a. *Probe:* If yes, was this through a project or something you decided to do individually?
 - b. *Probe:* What types of trees did you plant? Are they still surviving?
 - c. *Probe:* Have you experienced any benefits on your fields from these agroforestry trees? Why or not?
 - d. *Probe:* What are the main challenges you encountered? Were these able to be resolved? Why or why not?
- 2. Has there been any agroforestry project here in this village in the past four years, since 2017?
 - a. *Probe:* If yes, through what organization?
 - b. *Probe:* If yes, please describe how this project worked? What types of trees were planted?
 - c. *Probe:* Did anyone here in this group participate directly in this project?
 - d. *Probe:* Have you experienced any benefits from the project? Why or not?
 - e. *Probe:* What are the main challenges you encountered? Were these able to be resolved? Why or why not?

- f. *Probe:* What suggestions would you make to help agroforestry projects in this village be more successful in future?
3. Has anyone here in this group participated in any agroforestry project before 2017?
 - a. *Probe:* If yes, through what organization?
 - b. *Probe:* If yes, please describe how this project worked? What types of trees were planted?
 - c. *Probe:* Have you experienced any benefits yet from the project? Why or not?
 - d. *Probe:* What were the main challenges you encountered? Were these able to be resolved? Why or why not?
 - e. *Probe:* What suggestions would you make to help agroforestry projects in this village be more successful in future?
4. Are people in this group interested in planting agroforestry trees on your fields in future?
 - a. *Probe:* If yes, what benefits do you expect to gain from planting agroforestry trees on your fields?
 - b. *Probe:* If yes, what else would you need to help you achieve this?
 - c. *Probe:* If no, what are the main reasons you are not interested to plant agroforestry trees on any of your fields?
 - d. *Probe:* (regardless of yes or no) Do you think that having a customary land certificate can make you more likely to plant agroforestry trees on your field(s)? Why or why not?

E. EMPOWERMENT

1. In your households, who makes decisions about farming – you, your partner or spouse, or a combination?
 - a. *Probe:* What types of decisions do you make?
2. Who makes decisions about purchasing, selling or transferring land in your households – you, your partner or spouse, or a combination?
3. Have ownership or inheritance decisions about land belonging to your households changed since land mapping was done in this village / in the past five years? In what ways?
4. What are the main challenges that women currently face in this village about obtaining, inheriting and using land?
 - a. *Probe:* Have CLCs changed any of these challenges for women's land rights here in this village? If yes, how? If no, why not?

ADD-ON SECTION FOR WOMEN'S GDs ONLY:

5. How many people here in this group own and manage your own parcels of land here in this village, separately from your husbands or other family members?
 - a. *Probe:* How do plots that women own and manage differ from those than men own and manage, if at all? (for example, are they bigger or smaller, closer to home or further away, higher or lower quality for farming, different types of crops grown on them, etc?)
 - b. *Probe:* How many people here in this group have obtained a CLC for any parcels of land that you own and manage separately from other family members? May I see a show of hands?
6. Does land mapping or receipt of CLCs have any impact on how you and women in general are treated by one's husband, extended family members or the wider village community?
7. Are there any ways that land mapping or receipt of CLCs has led to negative situations for you or other women you know in this village?

- a. *Probe:* What kinds of negative situations from other household members or extended family have women experienced? What do you think is the reason for this?
- b. *Probe:* What about negative situations from others in the village, such as from neighbors or local leaders?
- 8. Do you think women are hesitant to own parcels of land because of negative consequences associated with land mapping or receipt of CLCs?
- 9. Have you (or women you know) experienced any form of physical violence, sexual violence, verbal abuse, psychological/emotional abuse or economic abuse as a consequence of land mapping or receipt of CLCs?
 - c. *Probe:* Who is typically the perpetrator of this abuse?
 - d. *Probe:* Has there been any change in the frequency and intensity of abuse?
 - e. *Probe:* Has your CLC been confiscated by your husband or family member?
 - f. *Probe:* Do you seek any support and from whom?

F. INCLUSIVENESS AND UNANTICIPATED EFFECTS

- 1. Do you think that all households in this village benefited equally from the project to map land and provide CLCs, including women and youth, poorest households and others? Why or why not?
- 2. Are there any other issues you think are important to address in order to strengthen tenure security and access to land for all people in this village?

G. CONCLUSION

- 1. Thank you for discussing these issues with us today. We asked a lot of questions and learned a lot from you. Is there anything that you would like to add, or would like to ask us?

KII PARTICIPANT REGISTRATION FORM:

Field Control		
Interview date: Month: _____ Day: _____ , 2021 Village Name: _____ Chiefdom Name: _____		Interviewer name: Notetaker name:
Respondent Name 1. _____ 2. _____ 3. _____ 4. _____	Age Gender (M/F)	Start time: ____ : ____ AM/PM (circle one) End time: ____ : ____ AM/PM (circle one)
Respondent category: (select one KII Protocol and one TGCC Village Status): ☐ KII Protocol #1: Landless individuals ☐ KII Protocol #2: Other non-participants in land mapping and customary land certificate registration ☐ TGCC Land Tenure Village (LT) ☒ ~~TGCC Agroforestry Village (AG)~~ ☐ TGCC Land Tenure + Agroforestry Village (LT + AG) ☐ ~~TGCC Control Village~~		
Comments on any aspect of the KII: 		

INTRODUCTION AND CONSENT: KEY INFORMANT INTERVIEWS

The Moderator should read the following consent script prior to the start of the group discussion:

Introduction

Hello, my name is _____. I am a researcher working with Palm Associates, a local data collection firm. We are conducting a study about agroforestry and land tenure in Zambia's Eastern Province. This work is funded by the U.S. Agency for International Development, and is being conducted by an NGO in the US called NORC. I would like to ask you some questions to better understand your experience with agroforestry and land tenure. Your participation is entirely voluntary. This conversation will be recorded by a digital voice recorder so we can be sure to capture all the information accurately.

This village was previously visited for this study, and we wanted to follow up with you now.

What will I do if I choose to be in this study?

Participants in these interviews are invited to participate because you live in one of the randomly selected villages in the study, and because you are a member of a group of interest for better understanding how agroforestry and land tenure issues might affect different groups of people in different ways.

If you agree to be part of the research study, you will be asked to participate in a group interview of up to three other people about agroforestry and land tenure activities in your village. The discussion will last about 30 minutes. At any time, you can decide to stop being part of this interview. If you choose to stop being part of the study, we will not ask you any more questions, but we will keep the answers you've given us unless you tell us otherwise.

What are the possible risks or discomforts?

Being part of this study does not involve any risks to you that are different than what you would experience day to day. Participation in this study will involve no cost to you.

What are the possible benefits for me or others?

You will receive a small compensation equivalent to K30.00 ZMW for your participation. You will not get any direct benefit from being in this research study beyond this. However, we hope that this study will help provide researchers and political leaders with a better understanding of the resources used and needed in Zambia.

What are my rights as a research participant?

We will respect any decision you make about answering any questions. You are free to stop being in the study at any time. You can also refuse to answer any questions at any time. Choosing not to be in this study or to stop being in this study will not have any bad consequences for you.

What about my confidentiality and privacy rights?

The responses from this interview will be combined with those from other interviews, which will include around 65 other people in total. Only general results will be reported, and no information will be reported which could be used to identify an individual or village.

We tell all participants that comments made during the interviews should be kept confidential.

However, it is possible that other participants in your group interview may repeat comments at some time in the future. Therefore, we encourage you to be as honest and open as you can, but remain aware of our limits in protecting confidentiality. To protect your responses, we ask that you do not share the details of the discussion outside of the interview session.

ALL PERSONAL INFORMATION WILL BE ENCRYPTED AND STORED ELECTRONICALLY TO KEEP IT SAFE.

Information from this interview may be used for research articles; however, we will not discuss your individual results. Your responses will be combined with those from approximately 16 other villages. Only general results will be reported, and no information will be reported which could be used to identify you or your village.

Who should I call if I have questions or concerns about this research study?

If you have questions about this survey, you may contact [Mr. Nathan Tembo, +] at Palm Associates. You may also contact the Biomedical Research Ethics Committee Chairperson via phone at +. If you have questions about your rights as a research participant, you may call the NORC Institutional Review Board Manager at +.

Do you have any questions for me?

Do you agree to participate in this research? _____ Yes _____ No

Participant's Name (printed) and Signature/Thumbprint _____ Date _____

Name (printed) and Signature of Person Obtaining Consent _____ Date _____
Village ID _____

[START THE RECORDER TO GET VERBAL CONSENT]

Do you agree to participate in today's interview?

[IF YES, CONTINUE DISCUSSION]

May we begin?

[Facilitator: Remember to fill out the KII participant form and note-taking form for each KII conducted].

KII PROTOCOL #1: LANDLESS INDIVIDUALS

This guide should be used for adult individuals who live in the village but do not themselves own or have access to land in the village.

We would like to talk with you about your experiences with land in this village and Customary Land Certificates (CLCs), including experiences you may have had with a USAID project known as the Tenure and Global Climate Change (TGCC) project. The TGCC project mapped and documented land rights in some villages in Chipata District, and provided villagers with Customary Land Certificates (CLCs). This project was implemented by the Chipata District Land Alliance and some other partners during 2014-2020. In some villages, the project also partnered with an agroforestry program through COMACO, to encourage tree planting on farms.

Opening Question: Do you know of the USAID TGCC project? Can you briefly describe what it did?

A. LAND RIGHTS, GOVERNANCE, DISPUTES, TENURE SECURITY

1. What does it mean to be landless, here in this village? What are some of the ways that people become landless in this village? What circumstances lead to this?
 - a. Probe: Are some types of people more likely to be landless than others (for example, women, poorer households, people under or over a certain age)? If yes, please explain.
2. Do people in this village view those who do not have access to land differently from others? How?
 - a. Probe: Is this different for men compared to women without access to land? In what ways?
3. How common is it here in this village for people not to have access to their own land?
 - a. Probe: Has this become more common or less common in the past 5 years? What are the reasons for any change?
4. What are the biggest challenges that you currently face with respect to access to land in this village?
 - a. Probe: How is land currently allocated in this village? What barriers do you face in obtaining land?
 - b. Probe: What options are currently available to obtain land in this village? What has been your experience with these options, if any?
 - c. Probe: Are you satisfied with the options for assistance that are available here in this village? Why or why not?
5. In your view, have there been any changes to land ownership or inheritance decisions in this village, since land mapping and documentation of land rights via customary land certificates took place?
 - a. Probe: If yes, in what ways?
 - b. Probe: If no, what do you think the reasons are for no changes?

B. INCLUSIVENESS AND UNANTICIPATED EFFECTS

1. Are there any ways that land mapping or receipt of CLCs for people in this village has led to a negative situation for you or others you know in this village, whether from other members of your own household, extended families, or others?
 - a. Probe: What kinds of negative situations have you or others experienced from members of your own household or extended families? What do you think is the reason for this?
 - b. Probe: What kinds of negative situations have you or others experienced from others in the village, such as from neighbors or local leaders? What do you think is the reason for this?
2. Do you think that all households in this village benefited equally from the project to map land and provide CLCs, including women and youth, poorest households and others? Why or why not?
3. What are the main issues you think are important to address in order to strengthen tenure security and access to land for all people in this village?

C. CONCLUSION

1. Thank you for discussing these issues with us today. We asked a lot of questions and learned a lot from you. Is there anything that you would like to add, or would like to ask us?

KII PROTOCOL #2: OTHER NON-PARTICIPANTS IN LAND MAPPING AND CUSTOMARY LAND CERTIFICATE REGISTRATION

This guide should be used for adult individuals who live in the village and have access to land in the village, but did not participate in land mapping or did not receive a customary land certificate.

We would like to talk with you about your experiences with land in this village and Customary Land Certificates (CLCs), including experiences you may have had with a USAID project known as the Tenure and Global Climate Change (TGCC) project. The TGCC project mapped and documented land rights in some villages in Chipata District, and provided villagers with Customary Land Certificates (CLCs). This project was implemented by the Chipata District Land Alliance and some other partners during 2014-2020. In some villages, the project also partnered with an agroforestry program through COMACO, to encourage tree planting on farms.

Opening Question: Do you know of the USAID TGCC project? Can you briefly describe what it did?

A. PARCEL MAPPING AND DEMARCATION; CLC RECEIPT AND UPDATING

1. What year was land mapping conducted in your village? What year were customary land certificates provided to people in this village?
2. What challenges did you encounter related to participating in land mapping in this village?
 - a. Probe: Were any options available to resolve these challenges? What were your experiences with these options, if any?
3. What challenges did you encounter related to obtaining a customary land certificate for land that you use in this village?
 - a. Probe: Were any options available to resolve these challenges? What were your experiences with these options, if any?
4. In your view, what were the main reasons that some people who have land in this village were not able to have their land mapped or receive a customary land certificate?
 - a. Probe: In your experience, were there some who chose not to have their land mapped or receive a customary land certificate? If yes, what were the main reasons why?

B. LAND RIGHTS, GOVERNANCE, DISPUTES, TENURE SECURITY

Earlier, we learned about some of the common types of disputes over land in this district and different types of challenges for men and women who have land here.

1. What are the biggest challenges that you currently face with respect to your rights to land in this village?
 - a. Probe: How is land currently allocated in this village?
 - b. Probe: What are the most common types of land disputes that people here in this village experience?
 - c. Probe: How do you normally try to resolve such disputes? Are you satisfied with the dispute resolution options available here in this village? Why or why not?
2. Do you think the CLC can help to protect your land rights if you had one? Why or why not? If yes, against what types of disputes or threats?
 - a. Probe: Are there any types of land disputes or risks to losing land that you think the CLC would not be able to help with? Why?

3. Do you see any other benefits to having a CLC? What about potential drawbacks or negative consequences? Please explain.
4. If you wanted to have your land mapped or obtain a CLC now, do you know who to contact or what process to follow?
5. In your view, have there been any changes to land ownership or inheritance decisions in this village, since land mapping and documentation of land rights via customary land certificates took place?
 - a. *Probe:* If yes, in what ways?
 - b. *Probe:* If no, what do you think the reasons are for no changes?
6. To your knowledge, does your village currently have a Village Land Committee?
 - a. *Probe:* What year was the Village Land Committee formed?
 - b. *Probe:* What types of activities does the Village Land Committee do, to your knowledge?
 - c. *Probe:* Does the Village Land Committee play any role in land allocation in this village? If yes, please explain how.
 - d. *Probe:* How satisfied are you with the way that the Village Land Committee is supporting customary land in this village? Please explain why.
 - e. What else do you think would be needed to support the Village Land Committee to function? To strengthen the Village Land Committee's ability to support customary land here in this village?

C. INCLUSIVENESS AND UNANTICIPATED EFFECTS

1. Are there any ways that land mapping or receipt of CLCs for people in this village has led to a negative situation for you or others you know in this village, whether from other members of your own household, extended families, or others?
 - a. *Probe:* What kinds of negative situations have you or others experienced from members of your own household or extended families? What do you think is the reason for this?
 - b. *Probe:* What kinds of negative situations have you or others experienced from others in the village, such as from neighbors or local leaders? What do you think is the reason for this?
2. Do you think that all households in this village benefited equally from the project to map land and provide CLCs, including women and youth, poorest households and others? Why or why not?
3. What are the main issues you think are important to address in order to strengthen tenure security and access to land for all people in this village?

D. CONCLUSION

1. Thank you for discussing these issues with us today. We asked a lot of questions and learned a lot from you. Is there anything that you would like to add, or would like to ask us?

ANNEX B: SUPPLEMENTAL SUMMARY DESCRIPTIVE STATISTICS TABLES

Supplemental descriptive statistics tables are included in a final report package submitted separately to USAID.

ANNEX C: SUPPLEMENTAL FOOD SECURITY AND WOMEN'S EMPOWERMENT DESCRIPTIVE STATISTICS AT FOLLOW-ON

A wives' survey module was newly added to the TGCC IE household survey for the 2021 follow-on round of data collection enabled the evaluation to expand its coverage on food security and women's empowerment issues. The main respondent for the household survey is the household head, however a subset of questions in the wives' module were asked separately to both the household head and the primary decisionmaker of the opposite gender. For example, if the household head was male, this set of questions was asked to both the male household head, and then again to primary adult female decisionmaker in the household. This is done to enable additional exploration of intra-household differences on selected issues across primary male and female decisionmakers. For the A-WEAI-derived women's empowerment indicators that we report on, the primary female decisionmaker in our sample is always the wife of the primary male decisionmaker answering the same set of questions. For other indicators we report on in this section, as specified above, we summarize responses from the main household survey respondent or the primary female decisionmaker (in all cases, the spouse of the household head), where applicable.

This section provides additional reporting on descriptive summary statistics from Outcome Family 6 indicators and themes, since coverage on these issues was newly collected at follow-on.

FOOD SECURITY

The household survey asked several questions related to food scarcity over the 30-day period prior to the interview, to generate a standard measure of food insecurity. In general, the proportion of households that experienced some type of food scarcity was relatively low, reported by 15.7 percent of households (N = 403) surveyed at follow-on, compared to 9.8 percent (N=232) that experienced moderate to severe hunger. Indicators of food scarcity are consistent among the three TGCC treatment groups and households that remained in the control group at follow-on. Across all treatment groups at follow-on, roughly 12 percent of households reported having no food at home within 30 days prior to survey, compared to 13.2 percent of control households. Similarly, 11.2 percent of households from villages that received the Land Tenure intervention and 13 percent of households from villages that received any of the other TGCC interventions reported that a member of the household went to bed hungry because of lack of food, during the same time period. The proportion of households that had a member who experienced hunger for a full day was lower, reported by 8.2 percent of households from villages that received the Agroforestry intervention and 6.5 percent of households from villages that received the Land Tenure intervention. Among households that received the combined Land Tenure + Agroforestry intervention by the time of follow-on (regardless of whether this was in 2014-15 or 2018-19), 5.3 percent had a member who went hungry for a full day, compared to 8.8 percent of control households, a difference that is statistically significant at $p < 0.10$. Otherwise, households from any of the TGCC treatment groups did not differ significantly from the control group regarding indicators of food insecurity.

Figure C-1: Prevalence of Food Scarcity by TGCC Treatment Group



Using these responses, combined with additional responses about the frequency with which these three hunger situations occurred over the past four weeks (rarely, sometimes, or often), we calculated each household's score on the Household Hunger Scale (HHS⁸⁴). The HHS is a food deprivation scale that measures the percent of households experiencing hunger. The scale takes values from 0 to 6, where 0-1 equates to little to no hunger, 2-3 denotes moderate hunger, and 4-6 corresponds to severe hunger.

The results presented in Table C-1 shows that respondents tended to be at the lower end of the HHS, on average, and there were no significant differences in the degree of hunger observed between control households and households that received any of the three TGCC interventions. Based on the HHS, the percentage of households that experienced moderate to severe hunger was 10.7 percent (N=22) among sampled households that had not received any TGCC intervention by follow-on (control villages), and 10.4 percent (N=19) and 9.8 percent (N=105) among households that received the Agroforestry or Land Tenure interventions, respectively. Of the households that received the joint Land Tenure + Agroforestry intervention, 9.7 percent (N=108) experienced moderate to severe hunger. Additionally, hunger was unevenly distributed among chiefdoms and was most pronounced in Mkanda and Mshawa.

Table C-1: Households with Moderate to Severe Hunger

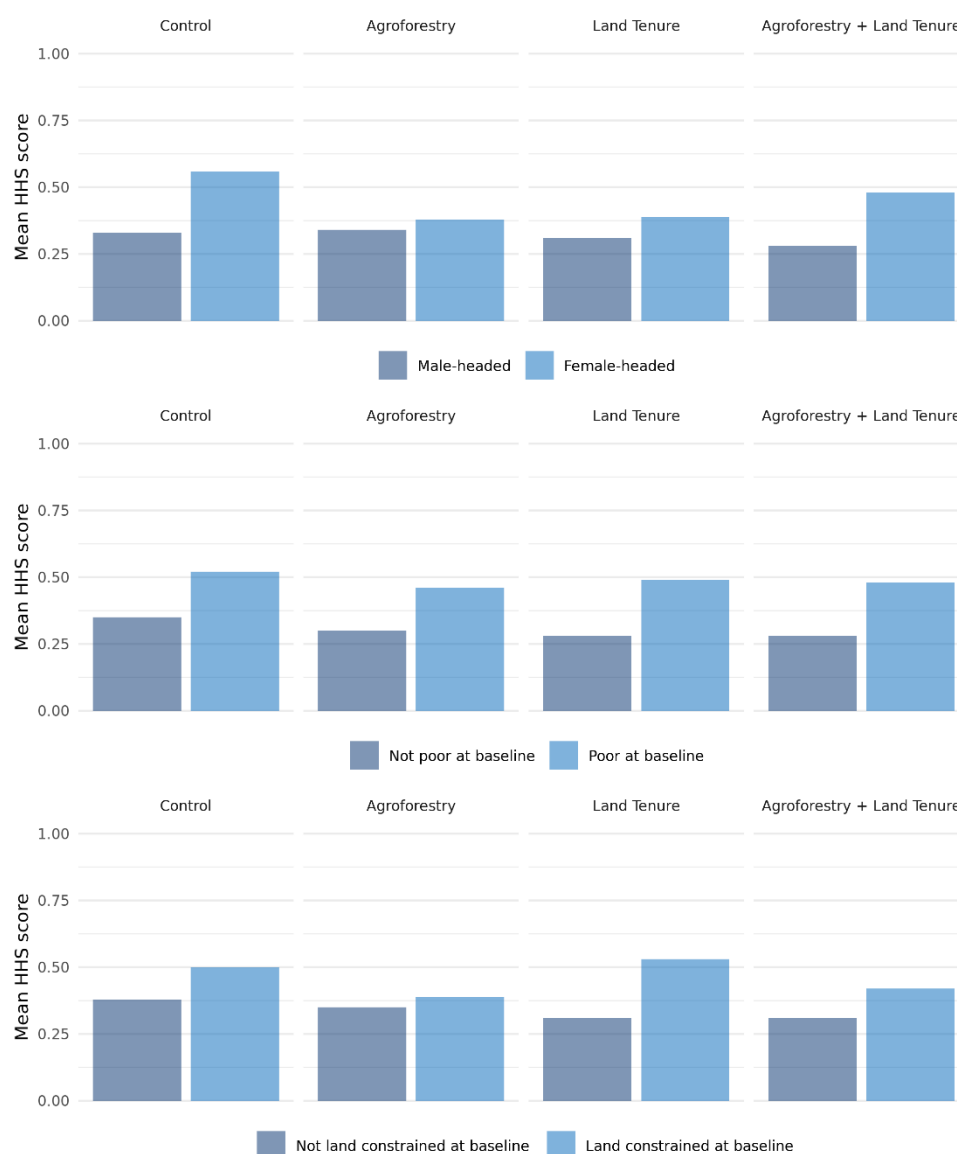
Chiefdom	Control		Agroforestry		Land Tenure		Agroforestry + Land Tenure	
	Freq.	N	Freq.	N	Freq.	N	Freq.	N
Maguya	6.4	125	10.7	149	9.0	167	7.3	177
Mkanda	11.2	134	18.4	158	15.4	136	5.2	116
Mnukwa	1.9	156	7.3	150	12.7	142	7.8	129
Mshawa	10.8	204	9.9	182	11.6	215	10.4	230

Sub-groups analysis based on household status at baseline reveals some additional differences in households' experience of food scarcity. Figure C-2 below shows the mean HHS score across chiefdom and treatment group according to household characteristics at baseline. At follow-on, households consistently experienced little to no hunger on average, despite being female-headed, poor, or land

⁸⁴ USAID, 2019. *USAID Food for Peace: Indicators for Emergency Program Performance Indicator Reference Sheets*. Washington, DC.

constrained at baseline. Land constrained households (that is, households with access to less than 1 hectare of land at baseline) show the lowest mean HHS score of these three potentially more vulnerable groups. Although potentially counter-intuitive, a potential explanation is that many households in the land constrained category appear to be those who may be less reliant on subsistence agriculture for their households' main food inputs, such as teachers or other salaried wage workers who may have greater means to purchase food. At follow-on, the overwhelming share of income reported by land-constrained households, on average, was from salaried employment, accounting for 76.6 percent of total average income, followed by livestock (13.8 of total average income).

Figure C-2: Mean HHS score by Treatment Group



Overall, levels of hunger are relatively low at follow-on, which is important to note given that data collection was conducted during the COVID-19 pandemic where there are overarching concerns on

potential disruptions to supply chains, labor availability, inflation, and other potential factors that could affect food security in rural areas of Zambia.

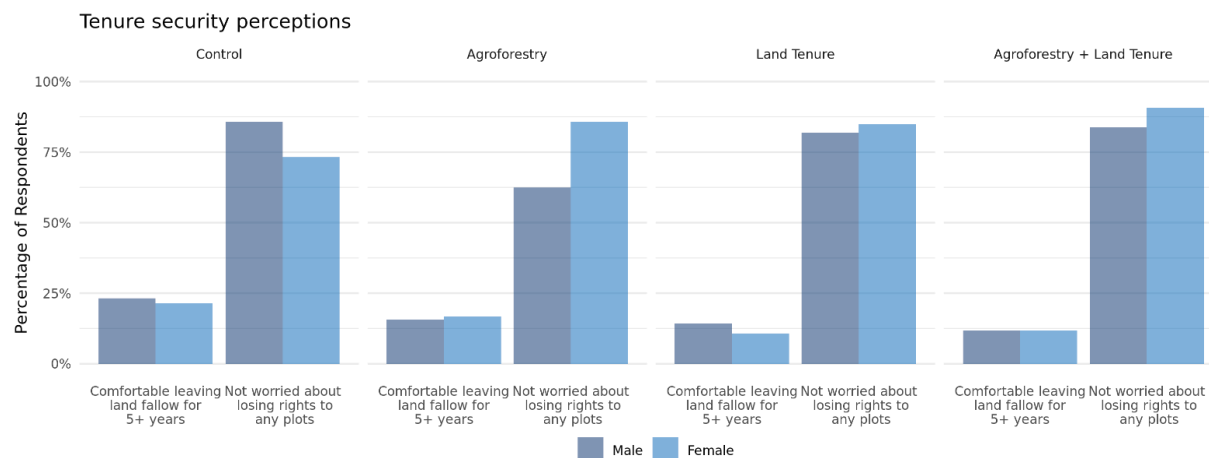
WOMEN AND LAND TENURE

Although the follow-on impact analysis points to a significant increase in women's possession of a CLC, the descriptive statistics highlight a significant gender gap in the level of familiarity with CLCs. One-third (32.6 percent; N=202) of primary female decisionmakers stated they were familiar with CLCs, compared to almost half (46.1 percent; N=524) of primary male decisionmakers.

To assess perceived tenure security and enable examination of potential differences across primary male and female decisionmakers within households, the primary male and female decisionmakers in each household were asked about the perceived likelihood that the respondent would involuntarily lose ownership or use rights to any plot within the next five years, and how long the household could leave its land fallow without worrying about losing use rights. Narrowing the scope of the analysis to only dual-adult households where both the primary male and female decisionmakers responded, the results presented in Figure C-3 paint a somewhat mixed picture of tenure security perceptions by gender. Perceived tenure security via these indicators was high, and suggested that both men and women were relatively tenure secure. Overall, female decisionmakers were significantly more likely to say they were not worried about losing their rights to any plot over the same time period (86.2 percent (N=582) of females, 82.0 (N=487) percent of males). Female respondents from households that received any of the three TGCC interventions at follow-on were also significantly less likely to worry about losing their rights than female respondents from households that remained in the control group at follow-on.

Despite appearing less worried about losing their land rights, female decisionmakers estimated that they could leave their lands unused or fallow for less time than male decisionmakers. Females said they could leave their fields fallow or unused without worrying about losing their land use rights for an average of 3.2 years, compared to an average of 4.1 years for males. For both men and women, respondents whose households had received the joint Land Tenure + Agroforestry treatment stated they were comfortable leaving their plots fallow for a significantly less average number of years as compared to the control, although there were no significant differences for the Land Tenure and agroforestry only treatment groups. Similarly, 58.0 percent of female respondents (N=357) said they would not feel comfortable leaving their fields unused or fallow for any number of years, compared to 52.3 percent of men (N=313).

Figure C-3: Perceived Tenure Security By Treatment Group and Gender



The follow-on data indicates that female decisionmakers also tended to be involved in less land-related disputes than male decisionmakers but were more likely to lose land because of a dispute. While only 10.7 percent (N=66) of female decisionmakers were involved in any type of land dispute in the past 3 years, 20.2 percent (N=125) of male decisionmakers were involved in a dispute, a difference that is statistically significant. Women were also more likely to lose land as a result of a dispute: at follow-on, 22.7 percent (N=15) of disputes for primary female decisionmakers and 3.0 percent (N=4) of disputes for primary male decisionmakers had resulted in the respondent losing their rights to a parcel. Responses regarding land-related disputes did not vary significantly across treatment status at follow-on when compared to the control.

The majority of female decisionmakers demonstrated positive beliefs about the strength of their inheritance and land-related rights. 68.1 percent⁸⁵ (N=418) of female decisionmakers said they were confident or very confident that in the event of their husband's death, she would be able to inherit her husband's land without facing challenges from others. 51.3 percent (N=319) agreed that there are laws that adequately protect the land rights of women. Another 23.2 percent (N=144) said that adequate laws do not exist, while 25.6 (N=159) said they were not familiar with the issue.⁸⁶ On the other hand, belief in one's right to bequeath land was more prevalent for men than for women. Only 7.3 percent (N=106) of female decisionmakers said they personally have the right to bequeath land, while 16.4 percent (N=102) said that they do not have the right to bequeath, but others in the household do.⁸⁷ Of these, 70.7 percent affirmed that the household head had the right to bequeath land; 22.3 percent said the spouse; 32.1 percent said an adult child; and 13.6 percent said another household member also held this right.⁸⁸ There were no significant differences in this pattern of responses across treatment groups at follow-on.

Male and female decisionmakers who reported not having paper documentation of their rights to use their fields were asked whether they would obtain documentation if they could. Respondents to this

⁸⁵ Based on a total sample of 614 primary female decisionmakers, or 47.9% of intended respondents for this question.

⁸⁶ Based on a total sample of 622 primary female decisionmakers, or 48.5% of intended respondents for this question. This question was a multiple response question, so counts for individual items may not add up to the total number of respondents.

⁸⁷ Based on a total sample of 622 primary female decisionmakers, or 48.5% of intended respondents for this question.

⁸⁸ This question was a multiple response question, so counts for individual items may not add up to the total number of respondents.

question were mostly comprised of households who had received the Land Tenure or joint Land Tenure + Agroforestry intervention at follow-on, but had not received a CLC (roughly 40 percent of respondents belonged to each of these categories); the remaining roughly 20 percent originated from Agroforestry and Control households that did not receive any land mapping or related Land Tenure program activities. At follow-on, 86.5% of male decisionmakers (N=1,542) and 85.2% of female decisionmakers who did not have documentation of their land rights (N=461) said they would obtain it if they could. Respondents were then asked to list the reasons why they would want to obtain documentation of their rights to use their fields; responses are shown in Table C-1. In general, male and female decisionmakers appear similar in how they view these advantages, with the main difference being a somewhat larger share of male decisionmakers (87.7 percent of male decisionmakers compared to 79.6 percent of female decisionmakers) saying that reducing the likelihood of losing land was a reason to obtain documentation.

Table C-1: Advantages of Land Documentation by Gender

Why would you want to obtain documentation of your right to use any of your fields?	Female Decisionmaker (%)	Male Decisionmaker (%)
Reduced likelihood of losing land	79.6	87.7
Strengthen children's inheritance rights	51.0	52.6
Protect investments	18.0	16.9
Access to credit	3.9	3.3
Other	0.4	13.7

PARTICIPATION IN PRODUCTIVE ACTIVITIES AND ECONOMIC DECISIONS

Table C-3: Plot Responsibility by Treatment Arm

Who primarily decides how to use this field?	Agroforestry %N	Agroforestry + Land Tenure %N	Control %N	Land Tenure %N	Overall %N
Head of household	83.5 (288)	76.3 (1548)	83.5 (340)	75.3 (1513)	77.0 (3689)
Spouse	2.3 (8)	3.6 (74)	1.7 (7)	4.0 (81)	3.5 (170)
Both Head and spouse together	11.0 (38)	17.7 (359)	11.8 (48)	17.4 (350)	16.6 (795)
Other male household member	0.3 (1)	0.8 (17)	1.5 (6)	1.2 (24)	1.0 (48)
Other female household member	2.0 (7)	0.4 (9)	0.0 (0)	0.6 (13)	0.6 (29)
Other	0.9 (3)	1.1 (23)	1.5 (6)	1.3 (27)	1.2 (59)

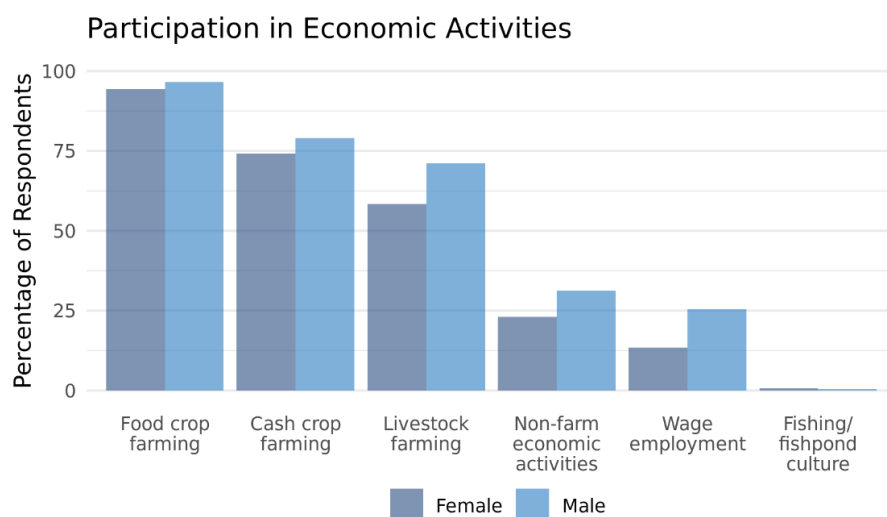
Table C-3 shows the percentage of fields where the primary decisionmaker for the field is the primary male or primary female decisionmaker, or someone else, as reported by the main survey respondent. Among all fields belonging to sampled households at follow-on, over 75 percent were under the primary decision-making responsibility of the household head across all treatment groups. Respondents from households in villages that received the Land Tenure or joint Land Tenure + Agroforestry interventions reported a higher percentage of plots where both the head and spouse together were reported to primarily decide how to use the field, at 17 or 18 percent, respectively.

In general, these differences reflect a context where female decisionmakers appear to be similarly engaged in agricultural and other economic activities as their male counterparts. The survey asked male

and female decisionmakers about whether they participated in each of six income generating activities, including food crop farming, cash crop farming, livestock farming, non-farm economic activities, wage employment, and fishing or fishpond culture. Narrowing the scope of the analysis to include only dual-adult male-headed households where both the male and female responded, participation in these economic activities was slightly higher for males than for females. 3.4 percent of all female decisionmakers indicated they participated in none of the six activities, compared to 0.5 percent of male decisionmakers. On average, female decisionmakers participated in 2.6 activities, compared to 3.0 activities for male decisionmakers.

The data allows us to examine which of the six activities present the largest gender gaps in terms of participation, shown in Figure C-4. While participation is higher for men on average, two activities stand out as having a particularly large gender gap: wage employment (13.4 for females; 25.5 percent for males) and livestock raising (58.5 percent for females; 71.1 percent for males), as well as non-farm activities to a lesser extent (23.1 percent for females; 31.3 percent for males). The narrowest gender gaps were found for fishing, where participation was low overall, farming for food crops or cash crops, for which participation was nearly full for both males and females.

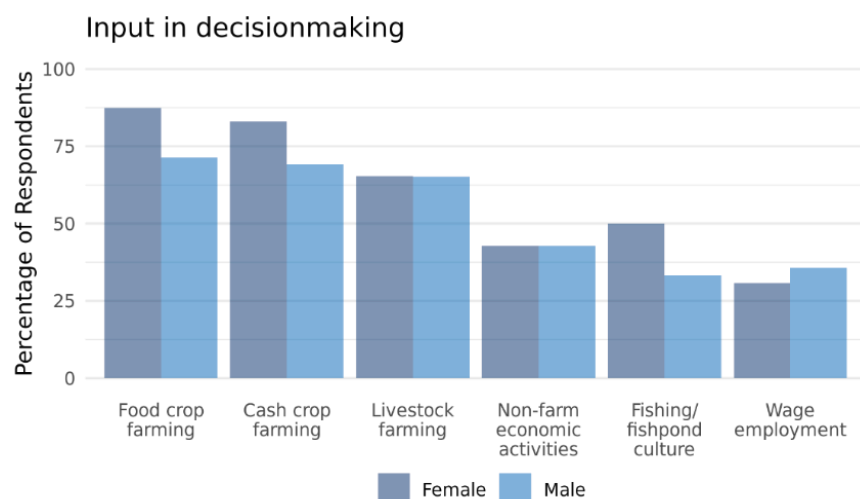
Figure C-4: Types of Economic Activities by Gender



For respondents who participated in each activity, they were asked who in the household usually makes decisions regarding the activity, and the amount of input they themselves had in making decisions about the activity. The results in Figure C-5 shows that for all activities except wage employment, a similar percentage of male and female respondents felt that had inputs into decisions for that activity, or more female than male respondents who participated in the activity felt they had some input into decisions on the activity. The largest gendered differences are found for cash crop farming, fishing, and food crop farming.⁸⁹ For example, 87.5 percent of female decisionmakers who participated in food crop farming felt they had at least some input into food crop farming decisions, compared to 71.3 percent of male decisionmakers who participated in food crop farming. However, while these results indicate women feel they are able to provide some inputs into decision-making regarding important economic activities, qualitative findings at follow-on suggest that men often ultimately have the final say in these decisions.

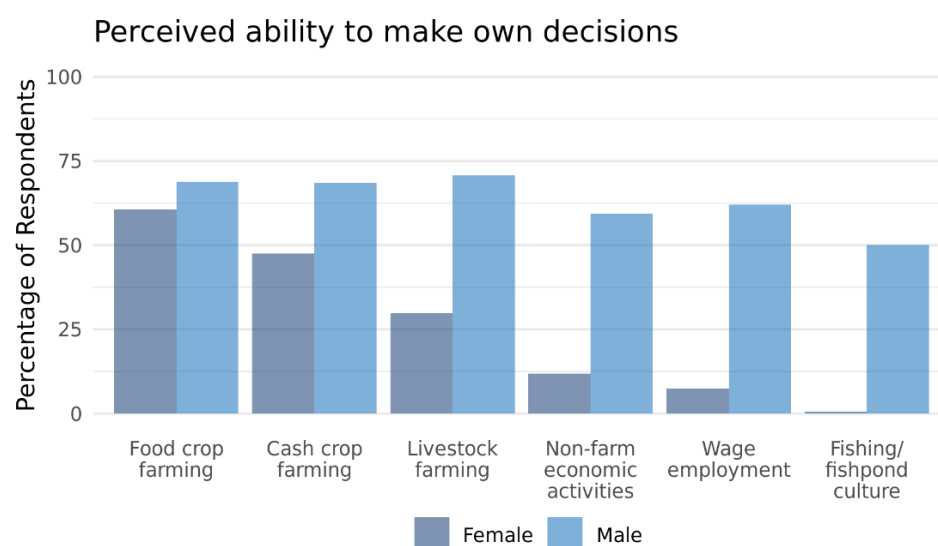
⁸⁹ But the proportion of respondent who participate in fish farming is low overall.

Figure C-5: Input in Decision Making by Gender



We gain further insight on this point from an additional set of questions asking respondents who participated in each activity about the extent to which they could make their own decisions on the activity if they wanted to. The results in Figure C-6 show consistent and large advantages for male decisionmakers across all types of economic activities. This provides evidence of a persisting gender gap across each activity, consistent with evidence from the qualitative data indicating that women may do much of the work for the activity within the household and contribute to decision-making, but men often enjoy a level of autonomy in their decisions that women do not.

Figure C-6: Ability to Make own Decision By Gender

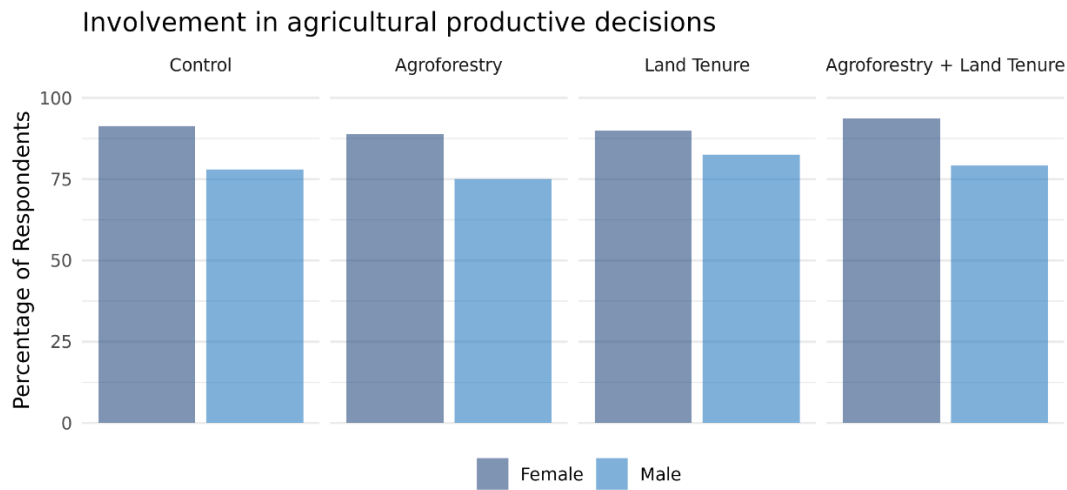


The evaluation team next constructed an indicator of empowerment in productive decisions, using the template provided by the Abbreviated Womens Empowerment in Agriculture Index (A-WEAI)⁹⁰. Specifically, “empowered” status for productive decisions is defined as having sole or joint decisionmaking power over at least one agricultural activity (i.e., food crop farming, cash crop farming,

⁹⁰ For more information, see A-WEAI documentation: <https://weai.ifpri.info/versions/a-weai/>

livestock, or fisheries) or being able to make their own decisions on at least one of these activities if they wanted to. The results in Figure C-7 show that for all treatment groups, a substantially greater share of female decisionmakers have empowerment status in agricultural productive decisions, based on the A-WEAI construction. This is somewhat contrary to our qualitative findings and could suggest the questions were interpreted differently by male and female respondents, and may also suggest that the A-WEAI metric is too coarse for the TGCC context. For female decisionmakers, the results also suggest that decisionmaking is a much greater barrier to empowerment than participation; in other words, focusing on making changes to the decisionmaking process amongst those who already participate in these activities may do more for empowerment than increasing participation in more activities.

Figure C-7: Empowerment in AGRICULTURAL Decisions

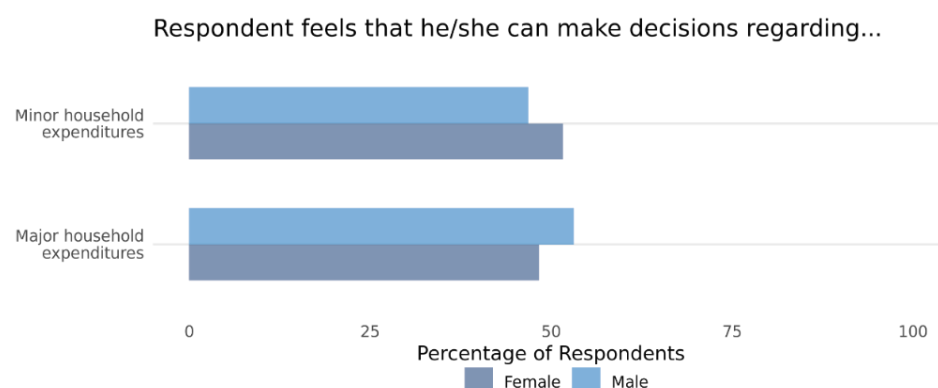


CONTROL OVER INCOME

Male and female decisionmakers were asked an additional set of questions about decisions on income from different economic activities, as well as decisions on major and minor household expenditures. This allowed the team to calculate an additional component of empowerment under the A-WEAI, which examines control over income. This component defines “empowered” status as having control over income from at least one economic activity, or feeling they can make their own decisions on non-farm activities, wage and salary employment, or major household expenditures. The results are shown in **Error! Reference source not found..**

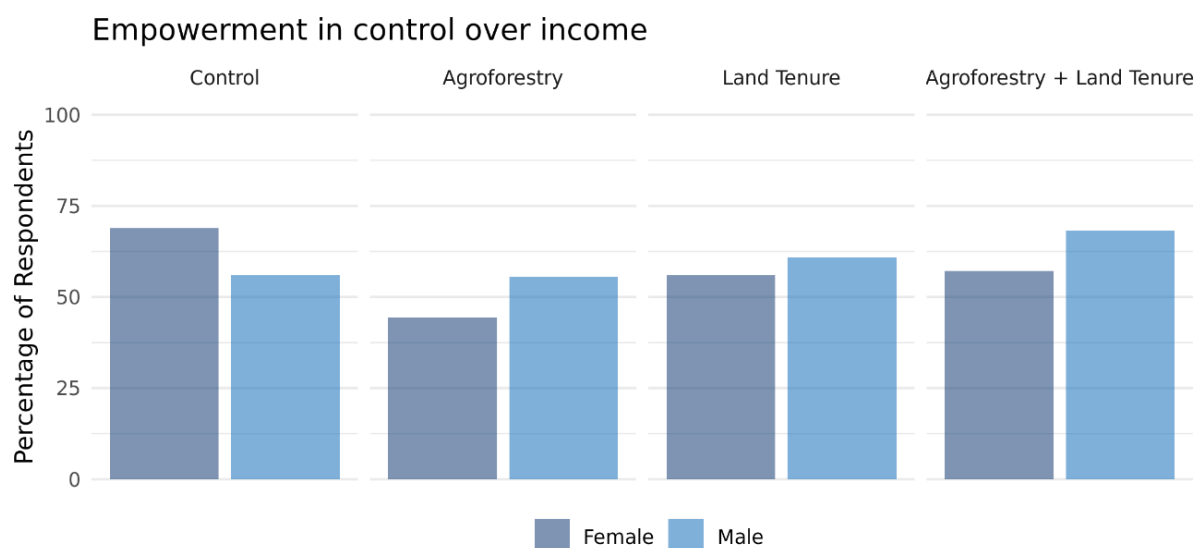
Among male and female decisionmakers who participated in the six economic activities, decisionmaking on income consistently favored women, with gender gaps that were often statistically significant. The largest gender gaps were seen for food crop farming (6.25 percentage-points), cash crop farming (4.3 percentage-points), and livestock raising (2.6 percentage-points). Additionally, as shown in Figure 8below, a greater share of female decisionmakers compared to male decisionmakers described themselves as able to make their own decisions minor household expenditures (51.7 and 46.9 percent, respectively). When looking at major household expenditures, however, a greater share of male decisionmakers indicated that they were able to make their own decisions (53.4 percent, compared to 48.3 percent of female decisionmakers). These results align with the idea that women see themselves as contributing to daily household management but defer to male decisionmakers for larger decisions.

Figure C-8: Control over Income by expenditure type



Constructing the control over use of income empowerment indicator, the results show that in communities that received any of the three TGCC treatments, male decisionmakers show a higher level of empowerment on this dimension. The results, shown in Figure C-9, suggest that men are near universally empowered on control over income use in treatment communities, and while most women are empowered on this dimension, there is still have room for improvement. However, this trend is reversed in the control group: female decisionmakers in the control group have a significantly higher level of empowerment than male decisionmakers (69.0 percent of females as compared to 55.9 percent of males).

Figure C-9: Empowerment in Control Over Income by treatment status



ASSET OWNERSHIP

Male and female decisionmakers were asked about whether anyone in their household owned a series of items across 14 different asset categories, and whether they themselves owned any of the item either solely or jointly. The results in Table C-4 show that for all assets included in the questionnaire, male

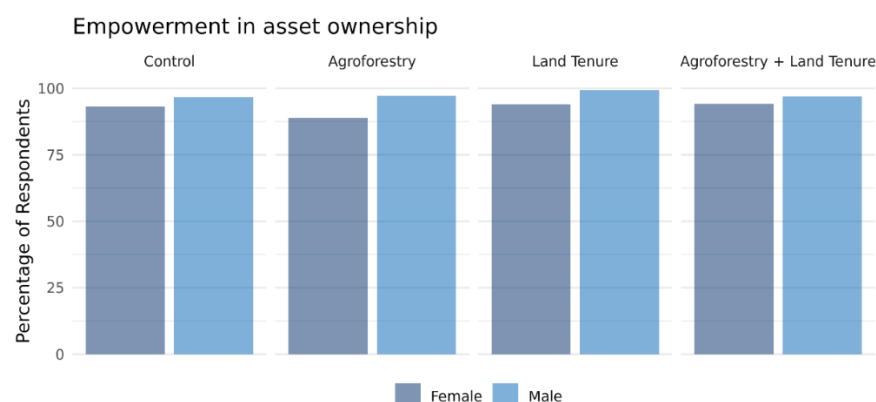
decisionmakers reported personally owning each asset more often than female decisionmakers. The largest gender gaps are shown for agricultural land, cell phones, non-farm business equipment, non-mechanized farm equipment, livestock, and transportation.

Table C-4: Asset Ownership

Asset	Female Decisionmakers	Male Decisionmakers	Overall
Agricultural land	54.2% (336)	61.3% (380)	57.7% (716)
Cell phone	55% (341)	69.5% (431)	62.3% (772)
Fish pond/equipment	1% (6)	1.1% (7)	1% (13)
House	61.1% (379)	65% (403)	63.1% (782)
Large consumer durables	19.2% (119)	20.6% (128)	19.9% (247)
Large livestock	37.6% (233)	42.7% (265)	40.2% (498)
Mechanized farm equipment	4.4% (27)	6.1% (38)	5.2% (65)
Non-agricultural land	28.7% (178)	29.7% (184)	29.2% (362)
Non-farm business equipment	29.2% (181)	40.3% (250)	34.8% (431)
Non-mechanized farm equipment	50.8% (315)	57.6% (357)	54.2% (672)
Poultry	63.7% (395)	65% (403)	64.4% (798)
Small consumer durables (e.g. radio, cookware)	44% (273)	47.7% (296)	45.9% (569)
Small livestock	51.9% (322)	57.4% (356)	54.7% (678)
Transportation	57.3% (355)	70.8% (439)	64% (794)

Note: This question was a multiple response question, so counts for individual items may not add up to the total number of respondents. Includes only primary male and female decisionmakers in dual-adult households where both the male and female decisionmaker responded to the gender empowerment module.

Figure C-10: Empowerment in Asset Ownership



These questions allowed the evaluation team to follow the A-WEAI template to construct an indicator of empowerment in asset ownership. This indicator classifies each of the items as either large or small, and defines empowerment in asset ownership as owning at least one large or two

small assets either alone or jointly. The results in Figure C-10 show that empowerment in asset ownership is near universal for both male and female decisionmakers across all treatment statuses, with female decisionmakers who received the agroforestry treatment showing slightly less empowerment. Empowerment in asset ownership is also slightly higher for male decisionmakers for each treatment status, with the largest gender gap being present in the agroforestry treatment group. These results are unexpected and suggest the A-WEAI definition of empowerment based on these particular assets may be too coarse or ill-suited for this implementation context.