USAID Land Technology Solutions (LTS) Project: Final Report

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ACROYNYMS AND ABBREVIATIONS

AWS	Amazon Web Services
CEL	Communications, Evidence, and Learning Project
CFMB	Community Forest Management Body
CFMP	Community Forest Management Plan
DMI	Data Management Infrastructure
ERC	Evaluation, Research, and Communication
FDA	Forestry Development Authority (Liberia)
FIFES	Forest Incomes for Environmental Sustainability
GDA	Global Development Alliance
GPS	Global Positioning System
ILRG	Integrated Land and Resource Governance Project
LADM	Land Administration Domain Model
LLA	Liberia Land Authority (Liberia)
LTA	Land Tenure Assistance Project
LTS	Land Technology Solutions Project
MAST	Mobile Applications to Secure Tenure
ME&L	Monitoring, Evaluation and Learning
ONF-BF	L'Observatoire National du Foncier au Burkina Faso (National Land Observatory of Burkina Faso)
SSG	SSG Advisors
USAID	United States Agency for International Development
USAID/E3/LU	USAID's Bureau for Economic Growth, Education and Environment, Office of Land and Urban
USDA	United States Department of Agriculture
USG	United States Government

1.0 INTRODUCTION

In April 2017, Resonance (SSG Advisors LLC) was awarded the USAID Land Technology Solutions (LTS) project, the purpose of which is to improve land and resources governance and strengthen property rights for all members of society in developing countries through the use of mobile technology. By improving, testing, and scaling USAID's Mobile Applications to Secure Tenure (MAST), the LTS Project will enable host-country stakeholders to document land rights cheaply, quickly, and efficiently.

LTS is envisioned to promote MAST as a scalable, worldwide, "fit-for-purpose" land technology framework and delivery mechanism to make it easier, cheaper, and faster to map and document land rights, and to learn critical information about land and its productivity potential. This knowledge will empower communities to better manage land resources, and make smarter decisions about their land, leading to more productive land-based investments, improved livelihoods, good governance, increased gender equity in access to and control over land, and helping achieve USAID development objectives worldwide.

LTS enables USAID missions to address sustainable investments in land by documenting and clarifying land rights and resources and linking with other information and applications to support decision making across a mission portfolio. Under LTS, MAST is implemented in selected countries to:

1. Provide a cost-effective, customizable ("fit-for-purpose") community-based technology framework within sustainable local systems to map and document land rights, and to clarify and secure land-based resources under different tenure regimes.
2. Facilitate the uptake of "fit-for-purpose" mobile applications at the Mission and host country levels.
3. Empower communities, especially women, with information and documentation needed to secure land rights, reduce gender equality gaps in land security, and to plan investments in land.
4. Provide evidence to inform USAID programming in food security, environment, democracy and governance.
5. Develop a set of tools and resources for USAID and host-country counterparts to determine the applicability of MAST in the local context, the local sustainability of its implementation, and feasibility, and support operations with analytical tools and communications guidelines.

Resonance, and its subcontractors Tetra Tech and Green Advocates, implement work under USAID Contract No. AID-OAA-C-17-00056. This is the second Annual Report summarizing activities and tasks completed during the project's first year – from April 1, 2018 through August 31, 2019. Project activities have been extended through August 31, 2019 through a no-cost extension mechanism.

2.0 BACKGROUND

Globally, an estimated 70 percent of land in developing countries is not documented. Land documentation provides people secure land rights and information about their land resources, and without it, people's ability to make informed socio-economic decisions or long-term, sustainable investments in land suffers. This problem disproportionately affects women, who are globally less likely to own or control land than men. Illustrating this, women's rate of ownership of agricultural land is significantly lower than their participation in agricultural production in developing countries.

Although many countries have made large investments in reforming their land information and management system, this problem persists. Land documentation remains unattainable for many due to the complexity, length, and expense of the documentation process. Beyond individual households, the ability to document and manage land information is critical to local governments and donors interested in supporting sustainable community development. Without access to secure tenure and information about available land resources, the development potential of land —the greatest asset available to many communities—goes unrealized.

In response to these challenges, USAID developed the Mobile Application to Secure Tenure (MAST), a participatory mapping approach that leverages a suite of low-cost, open-source tools that can be used to document land rights using mobile devices. Individuals and communities can use these tools to secure rights to land and natural resources within customary, indigenous, and statutory tenure regimes.

Building on the successful implementation of MAST in Tanzania, Zambia, and Burkina Faso, USAID designed LTS to update the MAST technology to be more flexible, adaptable, and user friendly, and to pilot new approaches for its implementation. USAID LTS was also designed to provide support to the USAID/E3 Land Office by developing high-quality communications materials and supporting USAID messaging to ensure USAID Missions and host-country stakeholders had sufficient information to deploy MAST. Ultimately, new pilots were launched in Burkina Faso and Liberia though USAID LTS.

Burkina Faso

MAST was first implemented in Burkina Faso prior to the beginning of LTS as a way to address land insecurity and increase resilience of rural communities to economic and climate shocks as a part of USAID's Resilience In the Sahel Enhanced (RISE) portfolio. Communities in the RISE zone in Burkina Faso make a living primarily through agriculture, livestock, and forestry on small family farms. Improvements in land tenure and security could significantly enhance progress toward USAID and Burkina Faso's development objectives. MAST was seen as a potential means to improve the efficiency and reduce the cost of documenting lands to achieve secure tenure, and was piloted through a partnership between USAID's Evaluation Research and Communication (ERC) project and the local NGO Observatoire National du Foncier au Burkina Faso (ONF-BF) in the commune of Boudry.

Following the success of the initial launch of MAST in Boudry, USAID ERC and ONF-BF sought to scale up MAST across additional communes in the RISE zone of intervention through collaboration with USAID's Resilience and Economic Growth in the Sahel- Enhanced Resilience (REGIS-ER) project, which operated in an additional five communes. However, local governments in the RISE zone have limited or no capabilities to implement formal land programs, and customary land tenure patterns are more prevalent than in Boudry. Implementation in the RISE zone required additional capacity building and technical training of local communities and land administration units. In partnership with USAID ERC and REGIS-ER, LTS provided technical support, guidance, and training to ONF-BF and REGIS-ER staff on

MAST technology and implementation, as well as monitoring, data collection, and analysis. LTS managed the customization of MAST to the Burkinabe context and provided training on the use of new software modules.

Liberia

USAID Liberia has invested significant resources supporting Liberia's community forests under a series of projects (LRCFP, PROPSER, and currently FIFES and indirectly through LGSA). However, the process to establish community forests in Liberia, outlined in the Community Rights Law of 2009, involves a comprehensive, lengthy process to identify, demarcate, and map community forest resources, establish community governance institutions, and to develop a community forest management plan. The LTS pilot in Liberia proposed a new use-case for MAST to improve and streamline the process to establish community forest using MAST's flexible, scalable and sustainable approach. The pilot sought to test MAST as a means of documenting and building an understanding among beneficiaries of community lands and forest resources for the development of a holistic Community Forest Management Plan (CFMP) to be used in forest management and monitoring.

At the pilot outset, LTS coordinated an assessment trip with Mission staff and USAID FIFES in order to investigate the feasibility of the suggested approach. With these partners, LTS developed an implementation plan for adapting the MAST technology and approach to support forest mapping and demarcation, forest zoning, monitoring and inventory of forest resources around the Blei Community Forest in Nimba County. Working through local partner Green Advocates, LTS engaged seven of the total forty forest communities surrounding Blei Community forest and executed a three-phase pilot. Phases including Forest Resource Mapping and Monitoring, Wider Landscape Resource Consolidation and Mapping, and Development of a Community Forest Management Plan. The pilot demonstrated a new model for community forestry programming based on the MAST approach and technology, with a particular emphasis on community-level engagement.

3.0 PROGRAM HIGHLIGHTS, ACHIEVEMENTS, AND MAJOR ACTIVITIES

Over the life of project, LTS achieved promising results in terms of upgrading the MAST technology framework, promoting the MAST approach and technology through diverse forms of communication, and engaging Missions to expand the use of MAST. Below are listed top-level program highlights, followed by achievements listed by the specific task under which they fall.

PROGRAM HIGHLIGHTS

- Improved MAST technology framework for more flexibility and adaptation to local contexts.
- Provided effective communications, capacity building and demonstrations to promote MAST.
- Engaged missions for expansion of MAST in Burkina Faso, and new use case for MAST in the Pilot in Liberia.
- Built capacity for use of the MAST technology and community-level approaches.
- Utilized inclusive and participatory frameworks that are gender sensitive.
- Effectively analyzed data from MAST implementations to enhance USAID learnings and help improve communications.

ACHIEVEMENTS

Task 1. MAST technology configuration and learning platform.

- Conducted technology analysis of MAST deployments and other land-related technologies to define a path for the update of the MAST technology software platform.
- Updated the MAST software platform to include new software frameworks, libraries and database structure. The update of MAST included adding new functionalities and tools to MAST including a tasking manager, a module to handle subsequent registration transactions, and a land use planning and resource mapping module.
- Updated, streamlined, and consolidated code on a MAST Github repository that includes consolidated software code from four different MAST instances: ERC Burkina Faso, MAST Land Tenure Assistance (LTA), LTS Burkina Faso and LTS Liberia.
- Designed, developed and helped launch the MAST Learning Platform on LandLinks, which has become the main source of information promoting MAST.
- Developed technical guidance documents for re-creation, deployment and implementation of MAST that follow international best management practices.

Task 2. MAST communications and pilot preparations.

- Supported branding of the MAST technology and approach.
- Developed and executed MAST communication plan.
- Engaged USAID in quarterly communication planning meetings.

- Developed effective communication materials for the promotion of MAST, which included five factsheets and blogs, six success stories, and 3 infographics.
- Provided effective technical and communication support to USAID at conferences, which included presentations and demonstrations of MAST technology.
- Provided presentations and webinars and effectively disseminated information to over 1,480 stakeholders and beneficiaries.

Task 3. Engagement with USAID Missions to pilot MAST and Learning.

- Developed concept notes for four countries for USAID missions that outlined conceptual approaches for implementing MAST in host country contexts.
- Conducted assessments in Burkina Faso and Liberia which included research that identified opportunities for implementing MAST s to improve land administration and management. Assessments sought to understand legal, technical and spatial frameworks for MAST, and how MAST could be aligned with these for future USAID Mission investments to help achieve impacts across portfolios.
- Collaborated with existing USAID partners and identified partners for implementation of USAID LTS programming.
- Identified data standards and software requirements in order to customize MAST for different local contexts, including Burkina Faso and Liberia. Customization considered existing or planned land information systems and how MAST could be used to support land administration and management in the future.
- Successfully piloted MAST in Burkina Faso and Liberia, achieving proof of concept in Liberia and providing technical support and advisory services for scaling in Burkina Faso.
- Effectively trained 415 local stakeholders, including land practitioners, professionals and beneficiaries so that they can contribute to the development and dissemination of MAST-related applications.

MAJOR ACTIVITIES

TASK 1: MAST TECHNOLOGY AND LEARNING PLATFORM

Task 1 of USAID's LTS project aimed to identify the strengths and deficiencies of the Mobile Applications to Secure Tenure (MAST) software and to refine it to make it more customizable for different country contexts and tenure regimes. USAID LTS also developed the MAST learning Platform on LandLinks to advance learning and collaboration around the use of MAST and demonstrate how to maximize its impact on strengthening land and property rights for all people in developing countries.

USAID LTS began this work by performing a **critical technology analysis** of USAID's MAST. This report provided USAID with an overview of previous MAST deployments and other land-related technologies. It helped to determine best practices and recommendations for updating the MAST software platform and licensing. Based on the finalization of the CTA report, and confirmation from USAID on software development priorities, USAID LTS **updated the license framework for MAST** to GNU General Public License 3.0 and contracted a **software development team to update of MAST.** USAID LTS selected RMSI to update and make

improvements to MAST. Core improvements resulted from RMSI's work[1] including updating Open Layers from version 2.x to version 4.5.0 and updating the MAST data model from the Social Tenure Domain Model (STDM) to the more robust Land Administration Domain Model (LADM). In addition, RMSI updated key software frameworks such as Spring and Hibernate, integrated a Jasper Reports engine and moved the mobile development platform from Eclipse to Android Studio. As part of their contract, RMSI also developed improved parcel workflow management tools, integrated a project tasking manager, new resource mapping module for the mobile application and developed a new land registry to the DMI for processing subsequent registration transactions.

USAID also **updated and streamlined MAST Github repository** and has consolidated software code from four different MAST: ERC Burkina Faso, MAST Land Tenure Assistance (LTA), LTS Burkina Faso and LTS Liberia. LTS has completed the new GitHub project, found here: https://github.com/mastusaid. In addition to its contractual deliverable of porting and consolidating software code on GitHub, LTS established an AWS account for MAST. The LTS AWS account now contains two instances of MAST: a demonstration server, and a server for Liberia, which is a production-level server configured for usage in the LTS Pilot in Liberia. In addition to making software code available on GitHub and understanding that the recreation of MAST required technical software development skills, USAID developed a "technology bullpen," which identified a pool of technology firms and consultants with software development capabilities to configure the MAST technology suite. It highlighted, firms and consultants with a robust and diverse set of technology skills needed to work with a broad array of technologies that underlie USAID's MAST.

USAID LTS also **developed, launched and supported the MAST learning Platform**. USAID LTS first developed a conceptual wireframe document that outlined the layout for the MAST Learning Platform (MLP) and coordinated the upload of this framework to the USAID LandLinks. USAID LTS developed the main page content and separate downloadable materials, including infographics. The MLP content focused on three thematic areas: MAST technology (which highlights key features of the MAST software); Implementation (which provides an overview of the implementation framework); and a section entitled "MAST in the Field" (which highlights examples of how MAST has been or can be effectively used to address development problems). Each section incorporated lessons learned and other evidence-based materials from previous MAST implementations into the content. USAID LTS also provided several updates for the MAST Learning Platform throughout the project, which include new written content, page design suggestions, cross-website linkages and new promotional materials for download.

USAID LTS also promoted the USAID E3/LU follow new promotional and implementation strategies. USAID LTS executed a series of summary and option reports provided an analysis of mobile technologies, stakeholders, implementing partners and competitors to identify a set of activities for USAID to boost the uptake, adoption, and use of its MAST program. The reports laid out a series of high-level recommendations for USAID to consider in its future promotion of the MAST technology and/or approach. USAID LTS also outlined transition pathways for two new USAID technical assistance programs to take ownership of MAS. These included the

1 LTS and RMSI did not have access to a live version of LTA application or database, and as a result, spent significant time to reverse engineer the application to understand these changes technically. The re-engineering work was not initially anticipated and took a significant amount of time, but nevertheless contributed to a better understanding of the updated database that had been reformatted under the USAID LTA project.

USAID Integrated Land and Resources Governance (ILRG) project and MAST promotional activities to USAID Communications, Evidence, and Learning (CEL) project.

The Monitoring and Evaluation work conducted for Task 1 focused on **Performing research to refine analytics for Learning Platform and defining ways to target of audiences.** For this, LTS followed the process outlined in its Monitoring Evaluation and Learning Plan (MELP) and monitored analytics of sight visits, unique page views, country, and user type. Over thr course of the project, information was reported to USAID in **Quarterly Reports** so as to provide information to USAID to help refine content, and gauge interest in LTS and the MAST technology and approach. Please see Annex A which highlights activity to the MAST Learning Platform in the LandLinks website, where key LTS communications materials have been placed.

Summary of Task 1 Results

Visits to the MAST Learning Platform steadily increased over the life of the project. The number of unique visitors at the project's conclusion was eight times higher than at baseline.[2] Downloads of MAST communications materials decreased slightly from Y1 to Y3, likely because audiences most amenable to MAST had already been reached.

LTS is not able to accurately pinpoint the number of USAID Missions accessing the Learning Platform or assess general user satisfaction with the platform. LTS developed an online survey to gauge these metrics, though ownership of the survey was transferred during Y2Q4 to CEL, USAID's communication partner.

Indicators	Base-line	Y1 (4/1/17 – 3/31/18)	Y2 (4/1/18 - 3/31/19)	Y3Q1 (4/1/19 - 6/25/19)	Life of project	Comments
1.1 Number of unique visitors to the Learning Platform (total and monthly average)	109 total, 27/month	Pages: 2,652 221/month Tabs: 732 61/month	Pages: 2,362; 197/month Tabs: 2,166; 182/month	Pages: 649; 216/month Tabs: 608; 203/month	Pages: 5,663; 210/month Tabs: 3,506; 292/month	MAST Learning Platform visitation has been positively influenced by blogs and infographics, MAST promotion at multiple World Bank Land and Poverty conferences; and Burkina Faso and Liberia pilots
1.2 Number of USAID	0	Unknown	Unknown	Unknown	Unknown	LTS has transferred ownership of the

[2] The baseline values are derived from analytics data on usage from November 2016 through February 2017 of the previous page on MAST (before the MAST Learning Platform pages were developed). The end date was chosen so as not to capture site visitation by SSG Advisors (Resonance) staff during preparation of LTS proposal or project start-up

Missions and USAID DC Offices accessing the Learning Platform						Learning Platform survey to CEL, USAID's communication partner.
1.3 End user satisfaction with Learning Platform	0	Unknown	Average: 3.5 out of 5 (1=very unsatisfied, 5=highly satisfied) (based on 2 responses)	Unknown (no responses to the survey this quarter)	Average: 3.5 out of 5 (1=very unsatisfied, 5=highly satisfied) (based on 2 responses)	LTS has transferred ownership of the Learning Platform survey to CEL, USAID's communication partner.
1.4 Number of downloads* of MAST communication materials (total and monthly average)	0	480; 40/month	398; 33/month	77; 26/month	955; 35/month	*This value reflects the number of unique visitors who have viewed the LTS Fact Sheet and the Overview of MAST and LTS document.
1.5 Number of unique visitors to the MAST Learning Platform pages with resources on or references to gender-sensitivity and/or inclusion (total and monthly average)	0	Pages: 372; 31/month	Pages: 412; 34/month	Pages: 66; 22/month	850; 31/month	For this indicator, LTS is tracking unique visitors to the *MAST in the Field* page and the *MAST Implementation* tab.

TASK 2: MAST COMMUNICATIONS

Task 2 of USAID's LTS project aimed at developing communication materials to ensure that USAID had enough information to promote MAST technology and approach to USAID Mission and host-country stakeholders. Under this this USAID LTS developed a series of high-quality communications materials focused on supporting USAID's messaging and marketing efforts.

USAID LTS initiated this task by developing a series of high-level plans that provided the framework for project communications. These included the USAID **Branding and Marking Strategy** and a formal **Communication Plan** for the LTS project. The Branding and Marking strategy provided a framework for communication and messaging around MAST, while the communication plan outlined strategies to increase awareness and understanding of MAST

among target audiences and to provide target audiences with adequate and clear information about both MAST's technology and approach to enable them to respond to the challenges inherent in implementing MAST and community-level mapping approaches. The primary group consists of USAID Headquarters, USAID Missions, host country stakeholders, and potential implementing partners, while a secondary wider audience consists of land professionals and international donor agencies.

Following on to software development conducted in Task 1, USAID LTS developed a new technical **MAST Deployment Guide**, which focused on helping stakeholders recreate MAST software frameworks. USAID also developed a **MAST Implementation Guide** which outlined a series of implementation principles and a high-level approach to MAST implementation that reflects best practices and lessons learned from previous MAST projects, including Evaluation, Research and Communication (ERC) Tanzania, Land Tenure Assistance (LTA) Tanzania, ERC Burkina Faso, Tenure and Global Climate Change (TGCC) in Zambia and Property Rights and Artisanal Diamond Development (PRADD).
To streamline communication efforts, USAID LTS implemented **quarterly communication planning meetings** that focused on identifying and prioritizing communication deliverables. This has proven to be an effective strategy for outlining requirements, responsibilities, and targeted deliverables. This has included working with USAID E3/LU to define communication requirements for each quarter. USAID LTS developed a series of communication materials for which included **fact sheets, blogs and success stories**. These materials highlighted evidence of MAST efficacy and efficiency in addressing general development problems related to insecure tenure and the high cost of land administration services and explained how to access USAID LTS services through the USAID/E3/LU. These included fact sheets, blogs, success stories, and infographics, as listed in **Annex B**.

In addition to standardized communication materials, USAID LTS developed communication materials to support USAID E3/LU mission engagement. To do so, USAID LTS created a **concept note template** to provide USAID E3/LU with a framework on how LTS would engage with USAID Missions. The submitted template provided an outline of how conceptual approaches for using MAST would be documented. Based on the above, USAID LTS was engaged by USAID E3/LU to **develop several concept notes**. These included concept notes for USAID Burkina Faso, which was based on an USAID LTS assessment trip. USAID also developed concept notes for Uganda, Liberia and Zambia. As part of its outreach efforts, USAID LTS promoted direct engagement of stakeholders and developed targeted presentations and participated or supported events. These included:

- Blog posts on outside website (Blog on SSG Advisors / Resonance Website)
- MAST PowerPoint Presentation for USAID
- Presentation at USAID (Brownbag Seminar)
- USAID LTS Services Sheet
- USAID Mission Buy-in Sheet
- Information Packages for Twitter Engagement
- Participation in World Bank Land and Poverty Conference (2018, 2019)

The Monitoring and Evaluation work conducted for Task 2 focused **Assessing information needs for communication materials**. USAID LTS worked to help determine communications needs and priorities related to promoting the expansion of MAST. Initially USAID LTS focused its attention on developing promotional materials for MAST but shifted its focus to promote more direct promotion and engagement of USAID LTS in USAID E3/LU marketing activities. Annex A

summarizes MEL progress under Task 2 for the LTS project. The dissemination of communication materials was tracked by USAID LTS and a survey instrument was developed to help USAID assess the relative effectiveness of different communications approaches.

USAID LTS also **conducted research to develop an understanding of how evidence stemming from MAST projects could be used to support USAID communications materials for promoting MAST**. USAID LTS also collected data from MAST implementation and executed a series of queries against that data to place it in a consolidated format that is in line with reporting expected under LTS. The outcome of this analysis was a series of tabular graphic presentations that were accompanied by narrative descriptions that allowed conclusions to be drawn from data across implementations. USAID LTS then worked with USAID E3/LU to identify key lessons arising from this data to highlight successes in infographics so as to highlight the key benefits of MAST technology and approach (i.e. gender equality, dispute resolution). In addition to the interactive graphics, data was formatted in summary sheets and static graphics that were integrated into communication materials or used separately to highlight efficiencies, effectiveness and inclusiveness of MAST and its approach. USAID LTS extract key points to reinforce the content on the MAST Learning Platform.

Summary of Task 2 Results

LTS made great efforts to engage with land experts and stakeholders by posting blogs and infographics, hosting webinars, and hosting a booth at multiple World Bank Land and Poverty conferences. MAST increased the breadth and quantity of its communications output in each successive year.

Indicators	Baseline	Y1 (4/1/17 - 3/31/18)	Y2 (4/1/18 - 3/31/19)	Y3Q1 (4/1/19 - 6/25/19)	Life of project	Comments
2.1 Number of tailored physical communications products distributed (excluding Task 3 pilot products)	0	100	288	0	388	Includes infographics and blog posts, largely distributed at World Bank conferences.
2.2 Number of individuals exposed to MAST technology and approach through workshops, presentations, and events (disaggregated by sex when possible) [3]	0	277 113 male 38 female 126 unknown	1,145 401 male 254 female 490 unknown	58 2 male 0 female 56 unknown	1,480 516 male 292 female 672 unknown	Liberia pilot individuals were community leaders, community youth, and recipients of zoning and inventory trainings

[3] At this time, LTS does not have the capability of measuring amount of views on blog posts.

2.3 Number of MAST products disseminated at workshops, events, in publications or through other mediums with information that includes how to make land governance more inclusive and/or gender-sensitive.	0	0	3	2	5	All 5 are blog posts, distributed through LandMatters newsletters and other media.

TASK 3: ENGAGING WITH USAID MISSIONS

Under Task 3, the LTS Team has collaborated with USAID/E3/LU and USAID Missions to assess the feasibility and barriers for piloting and scaling MAST, implement and evaluate pilots, and plan for scaling and sustaining MAST. While the activities under Task 3 have evolved based on USAID mission inputs and country contexts, LTS consistently provided technical support and advisory services focused on supporting, piloting, evaluating, and sharing lessons learned from piloting MAST in response to Mission demand and as resources allow.

USAID LTS initiated this task by **performing needs assessments** for the deployment of MAST. This activity culminated in the development of reports that were submitted by USAID E3/LU to respective USAID Missions in Burkina Faso and Liberia. This activity built upon the concept notes developed for these countries. In Burkina Faso, USAID LTS worked with the Observatoire National du Foncier au Burkina Faso (ONF-BF), the USAID Mission, and other implementing partners to define requirements and potential implementation options for MAST in the country. USAID LTS suggested that MAST be customized and be used as part of the USAID Resilience in the Sahel Enhanced (RISE) initiative under the Resilience and Economic Growth in the Sahel – Enhanced Resilience (REGIS-ER) project, which is being implemented by NCBA-Clusa. USAID LTS performed another assessment in Liberia to introduce, demonstrate, and assess the need for using MAST in USAID Community Forestry programming. Using a new model for mission support, USAID LTS worked closely with USAID Forest Incomes for Environmental Sustainability (FIFES) to identify ways it could support USAID programming in general and FIFES project activities in particular. Working closely with an existing project facilitated closer linkage with national and local stakeholders and more in-depth understanding of strengths and challenges facing forest beneficiaries. This partnership helped LTS define pathways for creatively integrating MAST into existing programming. As part of this assessment, LTS engaged in stakeholder interviews, community forest visits, and provided in-field demonstrations of MAST for FIFES and the Community Forest Management Board (CFMB) members. LTS also presented MAST to a national Community Forest Working Group (CFWG) and engaged in a strategic planning exercise to identify areas where MAST could support community forest governance in the country.

Following successful engagements in these two countries in Year 1, USAID LTS revised its approach for Burkina Faso and Liberia, and developed **pilot implementation plans** and budgets for both countries. For Burkina Faso, USAID focused on providing software development services and training associated with expansion of the ONF-BF's work in the Sahel region of the country. As part of its pilot preparation services for Burkina Faso, USAID LTS developed software development requirements, outlined training needs and engaged a

software development consultant. For its Liberia pilot, LTS developed a detailed implementation framework and budget, which detailed a phased approach for developing a holistic Community Forest Management Plan (CFMP) for the Blei Community Forest in Upper Nimba County, Liberia. The proposed plan outlined the modalities for a pilot project that seeks to document and build an understanding among beneficiaries in the Blei Community Forest of their community lands and forest resources.

In preparation for Pilots, the **MAST software was customized** for Burkina Faso and Liberia. For Burkina Faso, USAID LTS software customization activities included porting the older version of MAST and existing data into the new software framework. Subtle differences in database structures required changes to the underlying business layer and toolsets which are required for reviewing and processing data. The mobile application was also updated to include the proper capturing of new and existing claims as well as land use data and new attributes (i.e. chartered, validated by municipality, validation date, comments). Software development for Burkina Faso culminated with the migration of existing land record data into the new version of MAST. For Liberia, software customization involved the design and development of several new modules in MAST. These were needed to extend the use of the software to support community boundary mapping. The MAST data model has been extended to include a point layer, which allows for the capture of important metadata about community boundary points. Most importantly, it allows users to capture information concerning the level of confidence for each point. The points that have been ingested into MAST allow for the digitizing boundary layer by digitizing. The updated version also has integrated conservation and base data as well as new forest inventory and forest zoning maps. MAST customizations have been documented on GitHub and follow the same deployment guide that is available: https://github.com/mastusaid.

USAID LTS has provided MAST **implementation support to pilots** in both Burkina Faso and Liberia. In Burkina Faso, LTS executed an integrated training course for the ONF-BF and its partners. This one-week training course consisted of a series of PowerPoint presentations which were reinforced by software demonstrations. Training was designed to refresh users familiar with existing MAST software modules and to solicit feedback on newly developed modules. Following the training, USAID LTS has provided the ONF-BF with technical support which included troubleshooting of software and software configuration services to ready the software for deployment. Under USAID LTS, the ONF-BF has also taken over payments for the MAST AWS server completing the transfer of technology to a national level partner.

In Liberia, USAID LTS initiated a larger pilot initiative its pilot in the Blei Community Forest in Quarter 3 and is focused on testing the MAST approach and customized technology tools as part of an integrated community forest and resource governance pilot. The pilot is designed to test and provide a framework for a more holistic approach to managing community forest resources as part of CFMP development. The USAID LTS pilot was executed to help the Community Forest Management Body (CFMB) and communities better understand their land and resources and to develop a comprehensive CFMP. LTS anticipates that integrating and validating information through existing governance mechanisms, and specifically within forest communities, will demonstrate the importance of an integrated landscape approach to community forestry and help communities identify sustainable actions for conservation, monitoring, and for developing livelihoods in their communities. The LTS pilot in Liberia has been implemented through three (3) phases and seeks to provide technical support in consolidating land information for building a better understanding for forest resources, community-level mapping that engage citizens in identifying community boundaries and important resources within their communities, and development of a holistic Community Forest Management Plan (CFMP), which provides community-level governance groups and citizens

with information and a framework to address land and resource concerns and stimulating livelihoods in forest communities.

The Monitoring and Evaluation work conducted for Task 3 has focused mainly on developing pilot-specific **Monitoring, Evaluation, and Learning Plan** for its Pilot in Liberia. The plan details pilot indicators, a data quality approach, management and oversight responsibilities, a schedule of learning events, and specific tools that can be used to understand community perceptions of MAST's value, effectiveness, transparency, and motivations for improving land tenure security and land management at the community level. To operationalize the Liberia ME&L plan, LTS provided several hours of in-person and online training to Green Advocates International on the ME&L plan's contents and implementation. Baseline surveys were adapted to include additional data consistent with SDG modules 1.4.2 and 5.a.1 (Ver 3). Findings from the Baseline analysis are presented in Annex A.

Summary of Task 3 Results

Pilots in Burkina Faso and Liberia successfully used MAST to capture more than 20,000 hectares of land benefitting more than 15,000 individuals, while training 415 people to continue using the MAST approach after the pilots conclude.

Indicators	Base-line	Y1 (4/1/17 - 3/31/18)	Y2 (4/1/18 - 3/31/19)	Y3Q1 (4/1/19 - 6/25/19)	Life of project	Comments
3.1 Number of hectares captured by the MAST system	0	N/A	Total: 5,856 ha Burkina: 2,585 ha Liberia: 3,271 ha	Total: 14,614 ha Burkina: 714 ha Liberia: 13,900 ha	Total: 20,470 ha Burkina: 3,299 ha Liberia: 17,171 ha	In year 3, MAST usage in Liberia continues to ramp up, while Burkina is slowing.
3.2 Number of beneficiaries as a result of LTS MAST intervention, disaggregated by implementation pilot, and disaggregated by sex: male/female	0	N/A	Total: 913 669 male 244 female Burkina: 320 314 male 6 female Liberia:593 355 male 238 female	Total: 14,874 311 male 8 female 14,555 unknown Burkina: 319 311 male 8 female Liberia:14,555 0 male 0 female 14,555 unknown	Total: 15,787 980 male 252 female 14,555 unknown Burkina: 639 625 male 14 female Liberia:14,555 0 male 0 female 14,555 unknown	Burkina beneficiaries are primary landholders. Liberia beneficiaries are community leaders, community youth, and recipients of zoning and inventory trainings
3.3 Number of persons expressing	0	N/A	N/A	N/A	Liberia: 7,132 0 male	This is the number of people who expressed interest in a forest

interest in adopting improved practices under more secure tenure conditions, disaggregated by sex: male/female					0 female 7,132 unknown Burkina: no data	product or value chain program after participating in the LTS/MAST process in the Liberia pilot.
3.4 People's perception of effectiveness of MAST process, (transparency and inclusiveness), disaggregated by sex: male/female	0	N/A	N/A	N/A	Liberia: 95.3% found the LTS/MAST process to be transparent 98.9% male 92.2% female Burkina: no data	The question was: "After learning about the LTS/MAST process, do you think the project activities have been explained clearly and implemented in a clear and transparent manner?"
3.5 Time per land unit captured by the MAST system	0	N/A	N/A	N/A	Liberia: 1,399.2 ha per day	Burkina Faso pilot did not capture the data required to calculate this. Liberia mapping was completed in 10 days.
3.6 Cost per land unit captured by the MAST system	0	N/A	N/A	N/A	Liberia: $1.92 per hectare	Burkina Faso pilot did not capture the data required to calculate this. It's not clear that this indicator is appropriate for the Liberia pilot, which mapped a community forest and community boundaries. Per the LTS MELP, "costing information can only be gathered for systematic adjudication", meaning individual parcels. However, we have provided a rough estimate based on costing for the activity in our subcontractor budget. This is inclusive

						of key components of the MAST approach, including community training, outreach and work at the community level to understand and resolve disputes or difference related to the location of community boundaries.
3.7 Number of persons trained in MAST technology and approach, disaggregated by sex: male/female	0	N/A	328 100 male 18 female 210 unknown	87 10 male 1 female 76 unknown Burkina: 2 2 male 0 female Liberia: 85 8 male 1 female 76 unknown	415 110 male 19 female 286 unknown	This figure includes government staff, leadership of community land/forest management boards, local youth, and other stakeholders.
3.8 Number of planning and implementation documents produced by LTS related to Task 3 pilots	0	N/A	Total: 16 Burkina: 7 Liberia: 9	Total: 12 Burkina: 0 Liberia: 12	Total: 28 Burkina: 7 Liberia: 21	This includes various training materials, presentations, maps, agendas, trip reports, etc.
3.9 Percentage of MAST beneficiaries reporting awareness of their rights and the value of having their land demarcated under LTS, disaggregated by sex: male/female (only pilots where surveys are budgeted)		N/A	Burkina: N/A Liberia: 94.3% Male 92.1% Female 98.5%	Burkina: N/A Liberia: 94.3% Male 92.1% Female 98.5%	Burkina: N/A Liberia: 95.0% Male 96.7% Female 93.5%	Data not collected in Burkina.
GNDR-8: Number of persons trained		N/A	275	42	317	More than 75% of trainees had gender equality or women's

with USG assistance to advance outcomes consistent with gender equality and women's empowerment through their roles in public and private sector institutions or organizations						empowerment component as part of their training.

TASK 4: MONITORING AND EVALUATION

Task 4.1 Monitoring, Evaluation and Learning for Task 1

As the project progressed, LTS efforts resulted in the MAST Learning Platform receiving pageviews (total and unique) well above levels at baseline. New visitors comprised about 40-50% of all visitors, a steady upward trend from baseline. Drivers of web traffic include:

1. The posting of blogs and infographics exploring various aspects of MAST
2. LTS hosting a MAST booth and demonstrations at multiple World Bank Land and Poverty conferences
3. Pilots in Burkina Faso and Liberia
4. An April 2019 webinar on MAST

In Y2Q3, USAID posted to the MAST Learning Platform a survey instrument developed by LTS to gather additional user perceptions and to ascertain the relative effectiveness of content posted on the platform. User participation in the survey has been poor, and as a result, management of the survey was transferred to USAID CEL.

Table 1: MAST Learning Platform (MLP) Analytics

Metric	Base-line[4]	Y1 12/1/17 – 3/31/18		Y2 4/1/18 – 3/31/19		Y3Q1 4/1/19 – 6/25/19		Life of project	
		MAST LP pages	MAST LP tabs[5]	MAST LP pages	MAST LP tabs	MAST LP pages	MAST LP tabs	MAST LP pages	MAST LP tabs

[4] The baseline values are derived from analytics data on usage from November 2016 through February 2017 of the previous page on MAST (before the MAST Learning Platform pages were developed). The end date was chosen so as not to capture site visitation by SSG Advisors (Resonance) staff during preparation of LTS proposal or project start-up.

[5] In January 2018, the structure of the MAST LP was changed, with expanded information added to two MAST LP pages (MAST in the Field and MAST Technology). Visitation to this expanded content on those two pages is now tracked separately than visitation to the four MAST LP pages (What is MAST?, MAST in the Field, Overview: MAST Technology, and Overview: MAST Implementation) so as not to double count unique visitors.

Page Views	131: 33/mo	1,124: 281/mo	229: 85/mo	3,220: 268/mo	3,769: 314/mo	744: 248/mo	745: 248/mo	5,088: 188/mo	4,743: 176/mo
Unique page views[6]	109: 27/mo	804: 201/mo	166; 61/mo	2,362: 197/mo	2,166; 181/mo	649: 216/mo	608: 203/mo	3,815: 318/mo	2,940: 245/mo
New visitors	30% of total unique visitors	32% of total unique page visitors	27% of total unique events	37% of total unique page visitors	35% of total unique events	53% of total unique page visitors	43% of total unique events	40% of total unique page visitors	49% of total unique events
Country of User Net-work Gate-way[7] *(Page views)*	61% US 23% develop-ing and advanced develop-ing nations[8] (n=19)	61% US 30% develop-ing and advan-ced develop-ing nations (n=47)	58% US 32% develop-ing and advan-ced develop-ing nations (n=27)	58% US 26% develop-ing and advan-ced develop-ing nations (n=30)	61% US 26% develop-ing and advan-ced develop-ing nations (n=35)	59% US 30% develop-ing and advan-ced develop-ing nations (n=36)	61% US 28% develop-ing and advan-ced develop-ing nations (n=34)	59% US 29% develop-ing and advan-ced develop-ing nations (n=47)	60% US 29% develop-ing and advan-ced develop-ing nations (n=35)

Task 4.2 Monitoring, Evaluation and Learning for Task 2

LTS worked closely with USAID to determine communication needs for the project. As a result, LTS focused its monitoring and reporting on the effectiveness of LTS communications activities and products. MAST increased the breadth and quantity of its communications output in each successive year, eventually exposed 1,480 people to the MAST technology and approach through in-person workshops, presentations, and events. Nearly 400 physical products – infographics, fact sheets, and blogs – were distributed in-person, largely at a booth LTS hosted at the annual World Bank Land and Poverty conference.

Task 4.3 Monitoring, Evaluation and Learning for Task 3, as Needed

LTS completed complementary baseline surveys for the Liberia pilot in December 2018 and April 2019, subsequently sharing analysis with USAID.

LTS sought to achieve maximum M&E rigor within the confines of limited pilot resources. The December 2019 baseline employed a purposive sample of approximately 105 pilot trainees from all seven villages within the Blei Community Forest, with no comparison group.

The April 2019 baseline employed a quasi-random sample of approximately 200 pilot beneficiaries from all seven villages within the Blei Community Forest, with no comparison group. Employing the "random walk" method, data collectors surveyed every n^{th} household head.

As of June 2019, LTS is conducting a similar data collection exercise at the pilot's conclusion. To understand the pilot's effect, data analysis will compare baseline to end-of-pilot results regarding community perceptions of MAST's value, effectiveness, transparency, and other

[6] These figures include unique page views of the MAST Learning Platform main page and the embedded Technology and MAST in the Field webpages.

[7] With Google Analytics, LTS tracks the country location of the network gateway, and it is important to note that this may or may not correspond to the actual country location of the user.

[8] LTS uses the country categorizations established by USAID for developing and advanced developing countries in ADS 310: List of Developing Countries, file: 310maa_020612 and List of Advanced Developing Countries, file: 310mab_020612.

items. Qualitative data gathered from focus group discussions and key informant interviews will add depth to the quantitative survey data.

4.0 FUNDS OBLIGATED AND DISBURSED

The overall budget ceiling for LTS was $2,798,358.15, of which $2,091,169 was obligated and $2,001,575 is expected to be spent by the end of the current no cost extension at the end of August. USAID is currently considering providing an additional one month no cost extension through the end of August to support the transition of some Liberia pilot activities to USAID FIFES.

5.0 SUBCONTRACTING

Tetra Tech

As a major subcontractor, Tetra Tech's role primarily supported management of the MAST technology both in general and for the specific needs of pilot projects. Tetra Tech provided the project's Technical Manager as well as contributing to work under all four tasks. The Technical Manager supported programming, development oversight, testing, and quality control. Tetra Tech also contributed to develop of communications products and the technical design and implementation of pilots. The period of performance of this subcontract was from April 17, 2017 to August 30, 2019 for a ceiling amount of $463,911, of which about 28% was spent.

RMSI

RMSI's scope of work under the LTS project focused on analysis and support of the software components of the MAST technology. This included a review and update of the MAST software code, establishing a demonstration server on Amazon Web Service and feature reporting version control on GitHub. RMSI developed new functionality allowing geographic-specific tasking of data collection to help manage surveyors and prevent them from mapping outside of designated zones. Through this subcontract, LTS added additional functionality, such as a workflow to include the collection of data about community resources and checks to flag when mapped parcels overlap with other parcels. The period of performance was from July 13, 2017 to June 15, 2018 for a total amount of $74,825.

Green Advocates

LTS brought Green Advocates onboard to support the Liberia pilot in the Blei Community Forest. Green Advocates main responsibility was to engage with 7 of the 40 communities surrounding the Blei Community Forest through assessments of forest and land uses and management, trainings in the MAST approach for members of the Community Forest Management Board and target communities, and participatory land and resource mapping processes using MAST. Green Advocates used the products of these activities to engage communities to think through their natural resource use priorities that fed into development of an updated draft Community Forest Management Plan. The period of performance for Green Advocates was from November 15, 2018 to June 30, 2019 for a total amount of $131,450.

6.0 MAJOR CHALLENGES AND LESSONS LEARNED

CHALLENGES

1. Up-front investment necessary for implementing MAST

The MAST approach and tools require a sizeable upfront time investment before implementation can begin. MAST best practices include extensive sensitization and an assessment upfront, requiring a large investment of time and modest investment of financial resources. The MAST tools were developed on a series of open-source technologies and integrate a mobile application with back-end data management platform. Previously deployed MAST tools require expert consultation \to define requirements and customize technologies to meet specific needs, whether it be adapting to different mapping or survey requirements, ensuring consistency with legal processes, or working in different institutional settings with varied capacities. Data from Tanzania shows that over time, upfront investments required for MAST implementation result in improved efficiencies and high levels of trust in the data generated. Nevertheless, the initial investment of time, financial resources and specialized technical support for the MAST data management workflows and related software tools may represent a barrier to adoption by some stakeholders.

2. Programmatic uncertainty and constraints in stakeholder understanding of land technology frameworks

Initial engagement of missions during Year 1 took place in an uncertain funding environment, causing most missions to slow their decision processes for all new pilots, including those proposed by LTS. In Year 2, LTS had more success engaging with missions once this uncertainty had subsided. Mission staff may have further deprioritized LTS pilots during this period of uncertainty due to limited understanding regarding the ways MAST could be adapted to their programmatic needs without support from a land professional. Other mobile data collection tools, though less specific to land tenure mapping, are more intuitive and can be used out-of-the-box. These challenges likely reduced Mission buy-in for pilot cases of MAST under the LTS project.

3. Limited Technology Support

MAST was built using donor funds and has been deployed to USAID-funded projects through implementing partners. Likely due to the upfront investment required to launch MAST in a new country, its adoption has been limited outside of Tanzania, where it has been adopted by several organizations. In the absence of donor funding, implementations will remain limited. The existing MAST documentation and public code repositories developed for customized MAST tools have seen minor bug fixes in recent months, but no significant updates have been made. Similarly, the slow uptake by the land professional community and other stakeholders has been driven by the need for substantial upfront technical and financial inputs. MAST is an approach that relies on field engagement and specialized, customized tools. MAST pilots and subsequent scale-up have been supported through customized open source components, and like other commercially available off-the-shelf solutions that have been designed for land sector applications, these tools require technical and financial inputs.

LESSONS LEARNED

1. Direct demonstration approaches encourage uptake of MAST

Implementation of LTS project activities has emphasized the need for extensive engagement of Missions and stakeholders to solidify the uptake of MAST. Missions require extensive background – including concept notes, calls, demonstrations, site visits and/or indicative budgets – to make decisions on pursuing MAST implementation. Missions are unlikely to fund a project without understanding the full scope and expected utility in applying MAST to meeting Mission objectives.

Mission-level engagement should occur over a longer time period to ensure that national-level stakeholders are properly involved in planning potential activities. This engagement has the added benefit of building relationships and ensuring that work plans are consistent with local needs. Forging stakeholder relationships are critical and, in many countries, national-level stakeholder agencies are weak, in-transition or without clear leadership mandates. In this regard, a longer assessment period may improve project implementation, as it allows time for a full landscape analysis, reducing the need to switch locations or rearrange workplans later during the pilot.

2. Missions require technical assistance to encourage adoption of MAST

Missions may be interested in MAST implementation for a variety of reasons, especially in view of their existing portfolios or to add value to existing projects ranging from community forestry to women's empowerment and youth mapping initiatives. However, they need to see a clear use case for MAST and understand how to use, visualize, or integrate the approach and adapt MAST tools to support Mission portfolios.

Missions and other stakeholders require extensive engagement to understand opportunities, long-term data management needs and related requirements to adapt tools and to build local capacity. MAST is a proven approach that can tap into existing and adaptable data management tools, but it is also complex and its adaptation to specific contexts could require significant upfront investment. Direct investments by USAID for MAST pilots and technical assistance may go a long way to help with the uptake of the approach at the Mission-level.

3. Collaboration with implementing partners provides valuable context

Discussions with implementing partners uncovered several important considerations for pilot implementation in both Burkina Faso and Liberia. In Burkina Faso, for example, a key point was that a new MAST implementation framework should include more emphasis on gender parity as the inclusion of women in project processes had proven difficult in the past. Additionally, during the trip to Burkina Faso, USAID implementing partners highlighted that there would be difficulties implementing systematic adjudication in the Sahel region, particularly since conflict potential is high and commonly a result of competing land uses (i.e., famers vs. pastoralists) and traditional users vs. recent migrants to the region. This underscores the need to involve USAID IPs throughout the processes of pilot planning and implementation.

4. USAID and other donors can incentivize the use of MAST to increase uptake of the approach

For implementing partners, even contributing to a MAST demonstration project represents a cost, as witnessed in Liberia. LTS encountered challenges when attempting to integrate MAST into existing projects. Resources and budgets of existing, in-country projects were constrained, limiting their ability to fully integrate the MAST technology and approach into their work steams. Attempting to incorporate MAST into existing projects will often require effort that goes beyond existing workplans or budgets and therefore may not receive adequate support.

Direct involvement in the building of a use-case or scaling up the approach requires a time investment, which is often directly related to outsourcing the customization of the data

management workflows. In this regard, implementing partners may incorporate the approach in annual workplanning to align schedules and project resources. Additionally, technical support can stimulate the growing demand for MAST, and there is a clear need for targeted engagement with missions and implementing partners.

5. Data can be harvested to build a case for efficiency and efficacy of the tool

Previous MAST implementation pilots in various countries have yielded rich data and lessons learned that highlight the strengths and weaknesses of the MAST approach. Such findings show that the MAST approach has led to the promotion of gender equality, enabling women's economic empowerment, and that land certification may hold the key to improved community resilience to shocks and disasters. Ultimately, data derived from these pilots have demonstrated that MAST is both cost and time efficient in different regional contexts.

6. Defining pilot specific monitoring and evaluation plans are paramount for reporting on milestones and setting expectations of project outcomes

Pilot-specific monitoring and evaluation plans should be developed from the onset of the pilot. LTS employed this strategy for the Liberia pilot activity. Not only does this increase efficiency and accountability, it has the potential to reduce costs and contributes to evaluation of pilot activities, which do not always fall within the evaluation framework of larger project metrics. It also helps set expectations for project outcomes.

7. Understanding constraints around pilot-specific impacts is necessary

LTS pilot work in Liberia highlighted that the implementation of project work through NGOs requires oversight and long-term support to build capacity for implementation of the MAST approach. In addition, the capacity of local governance entities should be fully assessed prior to initiating pilot activities. LTS witnessed a disconnect between communities and the Community Forest Management Board (CFMB) that reflected a higher-level breakdown in the function of governance programs intended to be participatory. As such, future donor programming must recognize the limitation of pilot impacts, especially when timeframes are constrained.

Despite these constraints, the innovative nature of MAST in Liberian community forestry means that LTS pilot outcomes will still inform both forest and land policy in Liberia, especially on matters regarding development of Community Forest Management Plans (CFMPs), forestry registration, and the implementation of Liberia's Land Rights Act.

ANNEX A: ME&L REPORTING

Indicator	Baseline	Cumulative Totals Y1	Y2	Y3Q1	LOP	Comments
Result 1. Improved MAST and knowledge management through a dedicated online platform						
1.1 Number of unique visitors to the Learning Platform (monthly average)	27/month	Pages: 221/month Tabs: 61/month	Pages: 197/month Tabs: 182/month	Pages: 649; 216/month Tabs: 608; 203/month	Pages: 5,663; 210/month Tabs: 3,506; 292/month	MAST Learning Platform visitation has been positively influenced by blogs and infographics, MAST promotion at multiple World Bank Land and Poverty conferences; and Burkina Faso and Liberia pilots.
1.2 Number of USAID Missions and USAID DC Offices accessing the Learning Platform	0	N/A	Unknown	Unknown	Unknown	LTS has transferred ownership of the Learning Platform survey to CEL, USAID's communicatio n partner. Google analytics, which provides all other statistics for the learning platform, does not collect this information. A separate survey of each Mission and DC office would be required to capture this data.

1.3 End user satisfaction with Learning Platform	0	N/A	Average: 3.5 out of 5 (1=very unsatisfied, 5=highly satisfied) (based on 2 responses)	Unknown (no responses to the survey this quarter)	Average: 3.5 out of 5 (1=very unsatisfied, 5=highly satisfied) (based on 2 responses)	LTS has transferred ownership of the Learning Platform survey to CEL, USAID's communicatio n partner.
1.4 Number of downloads of MAST communication materials (monthly average)	0	40/month	33/month	77; 26/month	955; 35/month	*This value reflects the number of unique visitors who have viewed the LTS Fact Sheet and the Overview of MAST and LTS document.
1.5 Number of unique visitors to the MAST Learning Platform pages with resources on or references to gender-sensitivity and/or inclusion. (monthly average)	0	31/month	34/month	Pages: 66; 22/month	850; 31/month	For this indicator, LTS is tracking unique visitors to the *MAST in the Field* page and the *MAST Implementatio n* tab.
Result 2. Deployment and implementation information effective in increasing demand for MAST						
2.1 Number of tailored physical communication s products distributed (excluding Task 3 pilot products)	0	100	288	0	388	Includes infographics and blog posts, largely distributed at World Bank conferences.

2.2 Number of individuals exposed to MAST technology and approach through workshops, presentations, and events (disaggregated by sex when possible)	0	277 113 male 38 female 126 unknown	1,145 401 male 254 female 490 unknown	58 2 male 0 female 56 unknown	1,480 516 male 292 female 672 unknown	Liberia pilot individuals were community leaders, community youth, and recipients of zoning and inventory trainings
2.3 Number of MAST products disseminated at workshops, events, in publications or through other mediums with information that includes how to make land governance more inclusive and/or gender-sensitive.	0	0	3	2	5	All 5 are blog posts, distributed through LandMatters newsletters and other media.
Result 3. MAST pilot contribution toward improved land governance and secure tenure tested						
3.1 Number of hectares captured by the MAST system	0	N/A	Total: 5,856 ha Burkina: 2,585 ha Liberia: 3,271 ha	Total: 11,435 ha Burkina: 714 ha Liberia: 10,721 ha	Total: 17,291 ha Burkina: 3,299 ha Liberia: 13,992 ha	In year 3, MAST usage in Liberia continues to ramp up, while Burkina is slowing.
3.2 Number of beneficiaries as a result of LTS MAST intervention, disaggregated by implementation pilot, and disaggregated by sex: male/female	0	N/A	Total: 913 669 male 244 female Burkina: 320 314 male 6 female Liberia:593 355 male	Total: 14,874 311 male 8 female 14,555 unknown Burkina: 319 311 male 8 female	Total: 15,787 980 male 252 female 14,555 unknown Burkina: 639 625 male 14 female	Burkina beneficiaries are primary landholders. Liberia beneficiaries are community leaders, community youth, and recipients of

			238 female	Liberia:14,555 0 male 0 female 14,555 unknown	Liberia:14,555 0 male 0 female 14,555 unknown	zoning and inventory trainings
3.3 Number of persons expressing interest in adopting improved practices under more secure tenure conditions, disaggregated by sex: male/female.		N/A	N/A	N/A	Liberia: 7,132 0 male 0 female 7,132 unknown Burkina: no data	This is the number of people who expressed interest in a forest product or value chain program after participating in the LTS/MAST process in the Liberia pilot.
3.4 People's perception of effectiveness of MAST process, (transparency and inclusiveness), disaggregated by sex: male/female.	N/A	N/A	N/A	N/A	Liberia: 95.3% found the LTS/MAST process to be transparent 98.9% male 92.2% female Burkina: no data	The question was: "After learning about the LTS/MAST process, do you think the project activities have been explained clearly and implemented in a clear and transparent manner?"
3.5 Time per land unit captured by the MAST system	N/A	N/A	N/A	N/A	Liberia: 1,399.2 ha per day	Burkina Faso pilot did not capture the data required to calculate this. Liberia mapping was completed in 10 days.
3.6 Cost per land unit captured by	N/A	N/A	N/A	N/A	Liberia: $1.92 per hectare	Burkina Faso pilot did not capture the

the MAST system						data required to calculate this. It's not clear that this indicator is appropriate for the Liberia pilot, which mapped a community forest and community boundaries. Per the LTS MELP, "costing information can only be gathered for systematic adjudication", meaning individual parcels. However, we have provided a rough estimate based on costing for the activity in our subcontractor budget. This is inclusive of key components of the MAST approach, including community training, outreach and work at the community level to understand and resolve disputes or difference related to the location of community boundaries.

3.7 Number of persons trained in MAST technology and approach, disaggregated by sex: male/female.	0	N/A	328 100 male 18 female 210 unknown	87 10 male 1 female 76 unknown Burkina: 2 2 male 0 female Liberia: 85 8 male 1 female 76 unknown	415 110 male 19 female 286 unknown	This figure includes government staff, leadership of community land/forest management boards, local youth, and other stakeholders.
3.8 Number of planning and implementation documents produced by LTS related to Task 3 pilots	N/A	N/A	16	Total: 12 Burkina: 0 Liberia: 12	Total: 28 Burkina: 7 Liberia: 21	This includes various training materials, presentations, maps, agendas, trip reports, etc.
3.9 Percentage of MAST beneficiaries reporting awareness of their rights and the value of having their land demarcated under LTS, disaggregated by sex: male/female.	N/A	N/A	Burkina: N/A Liberia: 94.3% Male 92.1% Female 98.5%	Burkina: N/A Liberia: 94.3% Male 92.1% Female 98.5%	Burkina: N/A Liberia: 95.0% Male 96.7% Female 93.5%	Data not collected in Burkina.
USAID GNDR-8: Number of persons trained with USG assistance to advance outcomes consistent with gender equality and women's empowerment through their roles in public and private sector	0	N/A	275	42	317	More than 75% of trainees had gender equality or women's empowerment component as part of their training.

institutions or organizations.						

ANNEX B: LIST OF COMMUNICATIONS DELIVERABLES CREATED

1. Fact Sheets/Blogs
    - The LTS Fact Sheet (MAST and LTS services);
    - LTS Blog (MAST implementation in Tanzania);
    - LTS Blog for USAID Agrilinks (value of MAST for agriculture and food security);
    - LTS Blog for USAID Agrilinks (MAST and its enhanced for resource and land management); and
    - "What is MAST?" two-page fact sheet

2. Success Stories
    - Announcing launch of Learning Platform on LandLinks;
    - LTS's initial engagement in Liberia; and
    - MAST technology improvements.
    - USAID's MAST mobile tech programs promote women's empowerment in Tanzania and Zambia"
    - "Quick and Efficient: USAID's MAST mobile tools speed up time-consuming land mapping processes"
    - "What's new with MAST"

3. Infographics
    - "MAST improves efficiency and governance in documenting land rights."
    - "MAST is fit-for-purpose and adaptable"
    - "MAST improves women's economic empowerment"

4. Bi-weekly Mission updates
    - "USAID LTS Liberia Pilot: Forest conservation, biodiversity, and the wider landscape"
    - "USAID LTS Liberia Pilot: Community engagement"
    - "USAID LTS Liberia Pilot: Forest communities and the possibility of securing tenure in the wider landscape."
    - "USAID LTS Liberia Pilot: Using MAST helps communities visualize dispute areas prior to harmonizing their boundaries"