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CASE STUDY

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# Leveraging MAST in Natural Resource Management

Cross-Sectoral Uptake Throughout Tanzania

APRIL 2022

## What is MAST?

Mobile Applications to Secure Tenure (MAST) is a blend of participatory mapping approaches and flexible technology tools that USAID developed to empower communities to document and secure their land and resources rights in support of a range of development objectives ranging from women’s empowerment and food security to climate change mitigation and biodiversity preservation. The MAST technology suite consists of a mobile app and a web-based data management platform designed to help communities document their rights quickly and affordably. MAST’s participatory mapping methodology emphasizes on-the-ground engagement and training to empower citizens as data collectors and build their capacity to maintain land information and manage their land and resources. Through MAST, community members can efficiently collect information necessary to enhance tenure security—for example, names and photographs of people using and occupying land, names of neighbors who share a border, details about land use, and a basis for their land claims. Households can then use that information to obtain land documents.

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In Tanzania, MAST has been scaled from a small pilot that delivered 900 customary documents called CCROs in the village of Ilalasimba to a nation-wide program that a variety of donors and organizations including USAID, the U.K. Foreign, Development, and Commonwealth Office (FCDO) and others have used to deliver nearly 400,000 CCROs and counting.

For more information on MAST, see [here](#).

# MAST in Tanzania

USAID has used MAST in Tanzania since 2014 to help develop village land use plans (VLUPs) and expand the issuance of customary land titles, known as Certificates of Customary Right of Occupancy (CCROs). Prior to this work, fewer than a tenth of Tanzanian villages possessed a land use plan (USAID, 2016), and fewer than five percent of villagers had land documents (LTA Staff, 2020), in large part due to the limited capacity of the Government of Tanzania.

Undocumented property rights constrain economic growth and investment, exacerbate historical land disputes, fuel new conflicts over resources, and lead to unsustainable farming practices. Poor land governance often further marginalizes women, ethnic minorities, and other vulnerable groups such as poorer households, smallholder farmers, and pastoralists. In Tanzania, although women comprise 50 percent of the population and provide 80 percent of agricultural labor, data indicates that only 27 percent of landowners are women (Osorio, Percic, & Di Battista, 2014).

Most notably, the USAID Feed the Future Land Tenure Assistance (LTA) activity used MAST from 2015 to 2021 to support the development of VLUPs, document land ownership, increase understanding of relevant policies and laws, and boost administrative capacity in rural Iringa and Mbeya Regions. The approach was implemented in 54 villages in partnership with District Land Offices and village-level institutions, registering over 80,000 CCROs in total (Issa, 2021). The U.K. Foreign, Development, and Commonwealth Office (FCDO) also adopted the MAST approach in its own land registration project, scaling it further to 269,000 parcels and counting across Tanzania (Sullivan et al., 2019).

## The Benefits of MAST

Studies **show** that MAST is faster and less expensive than traditional land documentation methods and is an effective tool for documenting women's land rights and reducing land disputes (USAID, 2020a). For example, in Tanzania:

- After four days of MAST training, a team of eight youths **mapped their entire village**—937 parcels in total—in **under three weeks** (USAID, 2017).
- MAST dropped the cost of issuing CCROs from roughly \$40 per parcel to \$7.85 per parcel, a **five-fold decrease** (USAID, 2021).
- The MAST approach reduced the probability that a household **experienced a land dispute** in the previous six months **by 29 percent** (Ibid.).
- Pre-MAST data indicated that only 27 percent of landowners in Tanzania were women. Villages that used MAST to document land rights saw that figure nearly double, with **49 percent of plots registered to women** (USAID, 2020b).

# CROSS-SECTORAL APPLICATIONS: HOW COMMUNITIES ARE USING MAST

As LTA expanded its work, something unexpected happened: Tanzanian groups outside of the land tenure space—in sectors ranging from conservation to water and sanitation—started to express interest in using MAST for their own programs. During the last year of the project, more than a dozen groups asked LTA for training on MAST, and several have since evaluated or used MAST in their projects.

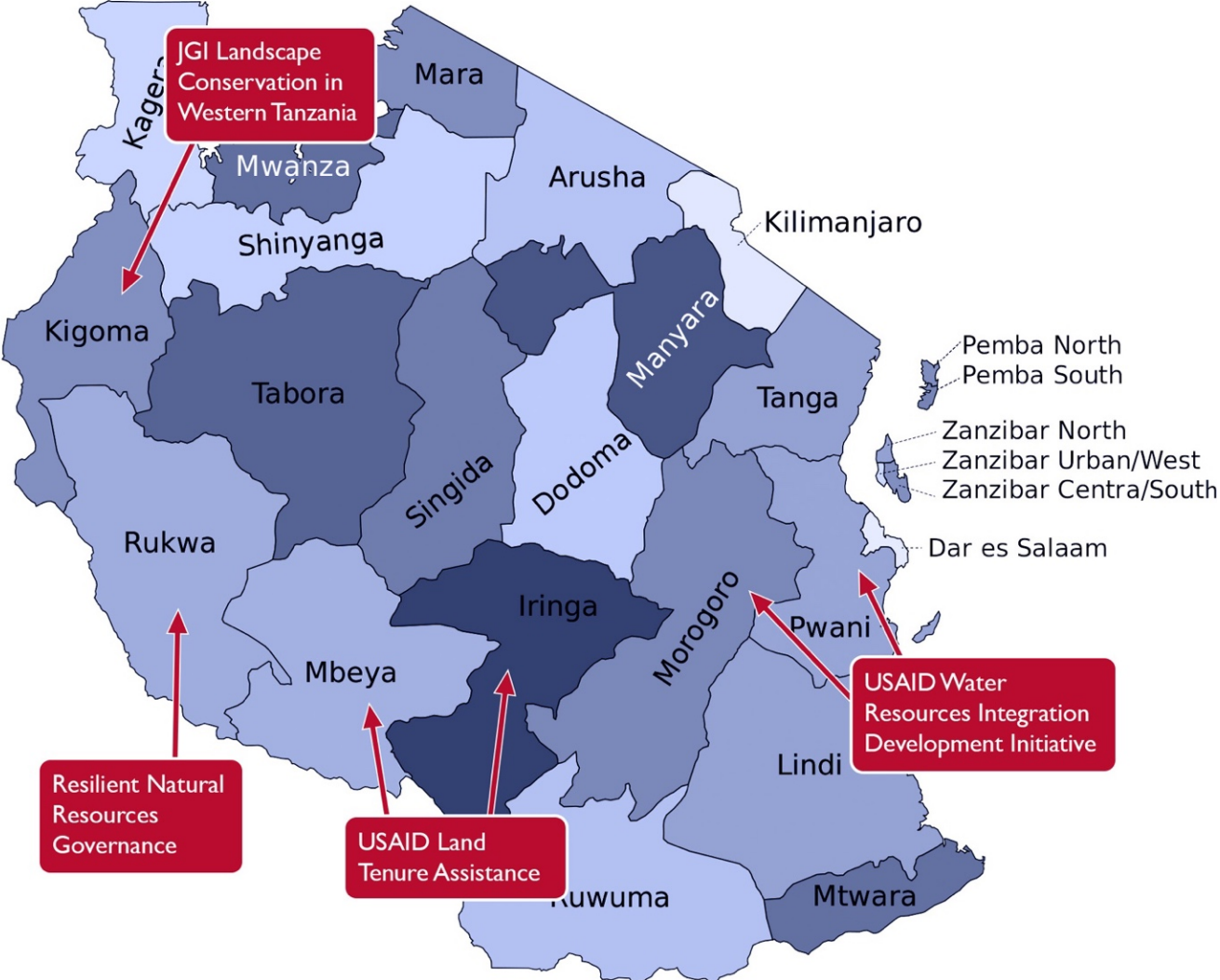


Figure 1: Map of Tanzania showing programs that have evaluated or used MAST.

## *LANDSCAPE CONSERVATION IN WESTERN TANZANIA PROJECT*

As part of the Landscape Conservation in Western Tanzania (LCWT) project, the Jane Goodall Institute (JGI) is working with 104 communities in Kigoma and Katavi Regions to conserve and improve chimpanzee habitats that overlap with village land. Approximately 90 percent of Tanzania's 2,200 chimpanzees live outside national parks and other protected areas. Their habitats are threatened by illegal logging, settlement expansion, and land conversion for agricultural or grazing purposes (USAID, 2019b).

To both safeguard chimpanzee habitats and empower local communities for sustainable and participatory land and resource management, JGI is collaborating with villages to develop land use plans and issue CCROs. A key assumption is that once forest reserves and individual parcels are delineated and formalized, community members will respect conservation area boundaries, limit the expansion of grazing and agricultural fields, and invest in their own plots.

During initial project implementation, LCWT quickly recognized that mapping land and issuing CCROs through more traditional methods was a labor-intensive and time-consuming process that left significant room for error during the data collection process (Kimbesa, 2021). Since MAST was considered a more accurate, efficient, and cheaper tool for systematic land registration, JGI traveled to Iringa Region to meet with LTA and receive training on the approach.

Returning to western Tanzania, JGI began to sensitize communities on the MAST process, CCROs, and national land laws by holding public rallies, targeted meetings with village leadership, and other mobilization events. JGI also used outreach activities as opportunities to recruit and then train volunteer surveyors, or para-surveyors, and also to staff land dispute adjudication committees. The project engaged with District Land Officers early in its planning to ensure that land officials were comfortable using MAST to issue ownership documents.

At the time of writing, JGI and its local partners are implementing MAST as a pilot in four communities, with plans to scale to 20 villages in total. The LCWT project expects the approach and its technologies will significantly reduce the time and cost associated with systematic land mapping, while helping to both protect chimpanzee habitats and empower village communities to manage and benefit from forest reserves and other natural resources.

## *WATER RESOURCES INTEGRATION DEVELOPMENT INITIATIVE*

The USAID Water Resources Integration Development Initiative (WARIDI) worked between 2016 and 2021 in multiple Tanzanian regions to address several cross-sectoral challenges facing local communities, including water scarcity, climate change impacts, and poor natural resource management.

As part of its climate change adaptation work, WARIDI identified three “hotspot” villages in the Rufiji and Wami-Ruvu river basins. These communities were particularly vulnerable to climate change, while overuse of natural resources and related incidents of conflict were increasing. The project worked with these communities to develop village land use plans and issue CCROs to encourage more sustainable management of resources and mitigate disputes related to resource access and scarcity (USAID, 2019d).

WARIDI adopted MAST for this work because its methods and technologies were simple and time-efficient. The project worked with District officials to raise awareness of land use planning, CCROs, and the MAST

process in the villages, ensuring that elders, youths, men, and women were included in outreach campaigns (Nyagawa, 2021b). WARIDI encouraged all community members to participate in the mapping process and collaborated with LTA to train village-level para-surveyors on MAST processes (USAID, 2019d).

A total of 54 para-surveyors—with an equal number of men and women—issued 1,960 CCROs across the three villages (USAID, 2020d). Following the recent completion of the project, community leaders noticed a significant reduction in conflicts related to parcel boundaries between family members, public institutions such as churches and schools, the private sector, and others. In the village of Magana, for example, the Village Executive Officer observed a decrease in land disputes between Maasai farmers and Mang’ati herders following mapping and formalization (Nyagawa, 2021a).

## *RESILIENT NATURAL RESOURCES GOVERNANCE PROJECT*

The Lawyers’ Environmental Action Team (LEAT), a Tanzanian NGO, is implementing MAST as part of the Resilient Natural Resources Governance (RNRG) project in the southwest Rukwa Region. The project concentrates on the biodiverse Lyamba Iya Mfipa ecosystem, an area threatened by competition between pastoralists, farmers, miners, and loggers (USAID, 2020c). RNRG aims to build local villages’ capacity to collaboratively govern and conserve land, wildlife, forests, and water resources.

To this end, LEAT and its community partners are developing village bylaws on natural resource management. Critical components include land and resource mapping and issuance of CCROs, which will help villages identify current land use practices and develop long-term strategies for more sustainable resource management (Lupembe, 2021b).

The project adopted MAST because its mapping approach and technologies are cost-effective, efficient, and easy to use. Hana Lupembe, Chief of Party with LEAT, highlighted that MAST allowed para-surveyors to collect spatial and land use data efficiently in the field, quickly fix any incorrect information, and link their collection efforts to national land information systems for rapid issuance of land ownership documents (Ibid.).

RNRG is continuing to use MAST as part of its larger land planning and registration efforts. LEAT and its community partners will first develop village land use plans through a participatory process while also training local residents on land rights, relevant laws, and property registration. Volunteer para-surveyors will then use MAST to document and process land claims, with a two-week correction period, resulting in the issuance of CCROs (Lupembe, 2021a).

LEAT first learned about MAST through its participation in the Land Tenure Support Program, coordinated by the Tanzania Land Alliance, which adopted the MAST approach to issue CCROs in Morogoro Region. Interested in further use, LEAT received training from both LTA and JGI. The NGO is currently procuring necessary equipment, helping to build capacity at District Land Offices, and preparing for implementation. LEAT and RNRG are planning to soon pilot the approach in one village before scaling to 15 other communities in Rukwa Region (Ibid.).

## MAST in the Rangelands: A Future Opportunity

Ujamaa Community Resource Team (UCRT), a Tanzanian conservation NGO, assessed the use of MAST and received training from LTA as part of the USAID **Endangered Ecosystems of Northern Tanzania (EENT)** project. Between 2015 and 2020, EENT worked with local partners to engage in land use planning and processes to secure communal land rights, improve natural resource management, and encourage sustainable economic activities in the Tarangire / Maasai Steppe. This landscape, located in the northern Arusha and Manyara regions, is critical to pastoralist communities, large migratory wildlife populations, and the Tanzanian economy (USAID, 2019a).

Pastoralist communities face serious threats of land loss in northern Tanzania due to a lack of tenure security over communal grazing lands (Parmelo, 2021). Large areas of open grazeland are often viewed as underused or unpopulated, leading to illegal grabs by urban elites and business interests. UCRT felt that land use plans and CCROs were an effective albeit overlooked tool to strengthen community land rights and create interconnected landscapes for both wildlife and livestock (Ibid.).

In the course of the EENT project, UCRT worked with eight pastoralist groups in over 83 northern Tanzanian villages to map and register communal land using high-accuracy GPS and other time-consuming and expensive methods (USAID, 2019c). Hearing about the use of MAST by the LTA project, UCRT technical staff traveled to Iringa Region for training and were impressed how the approach and its technologies could save time and energy for land mapping. UCRT sought to implement MAST for village land use planning, the demarcation of communal grazing areas and individual parcels, and the issuance of CCROs.

However, the larger EENT project closed down operations before UCRT could use MAST for this critical need. But the opportunity to implement the approach for communal land mapping remains—both in northern Tanzania and elsewhere. For example, since UCRT staff already received training on MAST, this local organization may be available for future implementation.

# BEST PRACTICES FOR INCREASING CROSS-SECTORAL ENGAGEMENT

How can more communities benefit from MAST? USAID/Tanzania Mission staff and implementing partners pointed to these best practices for improving the use of MAST across Tanzania and beyond:

## *SEEK OUT TECHNICAL EXPERTISE AND BUILD INTERNAL CAPACITY*

Smaller organizations are often eager to adopt MAST for their programming, but many lack the necessary technical expertise. Implementation likely requires a data manager or a geospatial specialist on staff, in addition to periodic support for troubleshooting and updating technology components. Experience from the LTA activity highlights the importance of providing MAST training and ad hoc support throughout implementation.

The USAID LTA project is closing operations in late 2021. Fortunately, LTA is planning to transition into a nonprofit organization. This move will capitalize on the widespread interest in MAST, continue MAST trainings, and further scale the approach. The organization plans to continue using a well-received “beneficiary contribution” model to recover operational costs and overhead and has the support of the Tanzanian Ministry of Lands and regional and local authorities to continue its work (LTA Staff, 2020). After this transition is complete, organizations interested in exploring or implementing MAST should contact the LTA NGO to learn more.

## *COMMUNITY ENGAGEMENT IS KEY*

Successful implementation of MAST requires early and repeated engagement between implementing partners and village-level beneficiaries. Public rallies, mobilization activities, and regular community meetings, including with village leadership and vulnerable or marginalized groups, were critical to ensuring that stakeholders understand MAST processes, the utility of CCROs, and land laws. Staff from the USAID/Tanzania Mission were quick to note that sustained engagement provided villagers with a “sense of ownership” over the initiative (Kimbesa, 2021). Mission staff described meetings in particular as helpful opportunities to recruit community volunteers to lead the mapping activities. Finally, buy-in from village elders’ councils, which have jurisdiction to hear land disputes under Tanzanian law, was important for parcel boundary conflict resolution (USAID, 2016).

## *CAPACITY BUILDING AT LOCAL INSTITUTIONS IS LIKELY NEEDED*

Village authorities typically work with District Land Offices (DLOs) to issue CCROs (Ibid.). Implementing partners from both the WARIDI and RNRG projects emphasized that long-term engagement with DLOs is critical to help build capacity and overcome a common hesitancy to adopt new techniques and technology. These key partners may also require regular MAST trainings due to staff rotations or employee turnover.

## *CONSIDER LONG-TERM FUNDING AND INTEGRATION*

Systematic land certification and any follow-up transactions necessitate staff support and the procurement of software and hardware, all of which require dedicated funding. International donors may be able to provide

funding for start-up costs and initial activities, but long-term financial support is not always possible.<sup>1</sup> However, land registration via MAST provides a solid foundation for more systematic property formalization. The approach can help governments better recognize the political, social, and economic value in long-term funding to continue these efforts.

In addition, to further encourage sustainable land-related services for communities across Tanzania, organizations that adopt MAST should ensure that formalization processes and data collection are integrated with other national land information systems. These include:

- The National Land Use Information System (NLUIS), which incorporates land information at the village, district, regional, and national levels, and;
- The Technical Register Under Social Tenure (TRUST) system, a low-cost tool for tracking land transactions and changes in land tenure throughout rural areas.

## Learn More

<a href="#"><u>What is MAST?</u></a>	<a href="#"><u>MAST in the Field</u></a>	<a href="#"><u>MAST Technology</u></a>	<a href="#"><u>The evolution of MAST</u></a>
<a href="#"><u>MAST Implementation</u></a>	<a href="#"><u>The LTA NGO</u></a>	<a href="#"><u>MAST and LTA</u></a>	



**Questions?** Contact the EEI/LRG team at [landmatters@usaid.gov](mailto:landmatters@usaid.gov)

<sup>1</sup> To further expenses related to village-level land registration in Iringa Region, LTA applied a “beneficiary contribution model,” within which households contribute to the cost of CCRO registration. However, this model should not be expected to cover all project expenses. For more information, please see LTA Staff, “Feed the Future Land Tenure Assistance (LTA): FY ‘20 Annual Report October 1, 2019 - September 30, 2020,” USAID, November 2020.



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