Request for Proposal #2018-016

Development of Administrative Area Registry System (AReS)

I. Summary of Deadlines

Release of Request for Proposal	22 May 2018
Fact-finding questions from the vendor received by	1 June 2018
Response to fact-finding questions	6 June 2018
Proposals due	**15 June 2018**
Selection of short-listed suppliers	22 June 2018
Interviews with short-listed suppliers (if needed)	25-29 June 2018
Bidders notified of decision	3 July 2018

Note: PATH in consultations with the Government reserves the right to modify this schedule as needed. In case of any changes in the schedule, all parties will be notified accordingly.

II. PATH Statement of Business

PATH is the leader in global health innovation. An international nonprofit organization, we save lives and improve health, especially among women and children. We accelerate innovation across five platforms—vaccines, drugs, diagnostics, devices, and system and service innovations—that harness our entrepreneurial insight, scientific and public health expertise, and passion for health equity. By mobilizing partners around the world, we take innovation to scale, working alongside countries primarily in Africa and Asia to tackle their greatest health needs. Together, we deliver measurable results that disrupt the cycle of poor health. Learn more at www.path.org.

III. Project Background - Development of Administrative Area Registry System (AReS)

A. Project Background

The Data Use Partnership (DUP) is a Government-led initiative that is improving the national health care system through better use of health information. DUP aims to strengthen the digital health and build local capacity so that everyone – from government officials to health workers to patients – can use health information to make more informed decisions, leading to a healthier Tanzania.

DUP Approach:
The DUP supports the implementation of Tanzania's Digital Health Investment Road Map, which builds upon the 2013-2018 eHealth Strategy. The Road Map outlines 17 investment recommendations for using data to improve health services and outcomes. Specifically, these recommendations aim to build robust health information systems, increase data use to identify and solve problems, measure performance and allocate resources; and for health workers use data to track clients, support clinical decisions and provide services efficiently and build local capacity in technology and governance.

Leadership:
The Ministry of Health, Community Development, Gender, Elderly, and Children (MOHCDGEC) and President's Office, Regional Administration, and Local Government (PORALG) lead this initiative. The Bill & Melinda Gates Foundation is providing catalyst funding to the Government of Tanzania to realize the vision articulated in the Digital Health Investment Road Map -- better information systems and use lead to better health. The international non-governmental organization PATH is providing technical implementation support to advance this vision.

Included within the DUP is implementation of an Administrative Area Registry System (AReS). The purpose of AReS is to facilitate the continual update and accessibility of administrative area lists and boundaries (e.g. villages, wards, and districts). This effort is expected to benefit both the health sector and other sectors by ensuring consistency of administrative area data, thereby enabling better data comparability and exchange.

The PORALG has collaborated with key Government institutions to establish requirements for AReS. The DUP now wishes to engage services of organizations with relevant software development and Geographic Information Systems (GIS) expertise to develop this system.

Organizations or consortiums of organizations with the relevant expertise are encouraged to submit proposals. While both international and local organizations are eligible to be members of a consortium, the work must be led by an established local Tanzanian organization with capacity to support the system in the long term.

All source code developed through this project will be released under appropriate free and open source licenses and be on Government custody (AReS will be fully owned by the Government). There is also a strong preference for use of open source platforms, tools, and technologies underlying the system.

B. Proposed Project Timeline

Project start date	23 July 2018
Interim deliverables due date	10 August 2018

Interim deliverables due date	21 September 2018
Interim deliverables due date	16 November 2018
Interim deliverables due date	14 December 2018
Final deliverable due date	1 February 2019

IV. Scope of Work and Deliverables

A. Scope of Work

- Review the business processes, requirements, and the user scenarios defined by the Government of Tanzania for AReS.
- Develop software which meets or exceeds requirements outlined in the attached requirements document making use of the latest technologies and platforms available at PORALG ICT Infrastructure.
- Collaborate closely with the PORALG, other Government institutions, the DUP team, and PATH throughout the assignment.
- Work closely with the DUP team using an agile or iterative development methodology to work towards system design that will meet the requirements outlined in the attached requirements document.
- Refine requirements and develop technical specifications, including documentation of data model and all other technical documentations.
- Develop AReS in-line with these specifications, including ensuring documentation and software are kept in sync with one another.
- Track AReS development, issues, and defects in a systematic way to be shared with the DUP team on an ongoing basis.
- Test the software against the established requirements and specifications and make sure AReS is integrated with PORALG Muungano Gateway (Interoperability layer).
- Attend and participate in user acceptance testing workshops.
- Ensure AReS incorporates all feedback from users.
- Develop user documentation in the form of user manuals, troubleshooting guides, and training materials.
- Develop API documentation for other software developers on how to connect their software to and make use of AReS.
- Provide co-facilitation services to training events organized by the DUP, which will comprise training of trainers and key staff on the functioning, troubleshooting, and maintenance of AReS.
- Provide one-year defect fixing and maintenance after launch of AReS.
- Provide one-year 2rd tier user support (1st tier to be provided by DUP team) after launch of AReS.

B. Deliverables

- Detailed business requirements (with functional and non-functional requirements) and technical specification documentation, building on the requirements outlined in the attached document and additional information gathered through the initial phases of this work, including documentation of data model.
- Detailed software development plan.

- Administrative Area Registry Software which meets documented requirements and performs the required functionality outlined in the specifications, as well as incorporating and addressing user feedback gathered throughout the process.
- User documentation and training materials in English.
- API documentation and training materials in English.
- Documentation of testing and testing report (UAT reports).
- Process mapping documents.
- Detailed system design and architectural design with detailed Database Schema docs (Infrastructure and Software).
- User responsibility matrix.
- System source code and detailed documentation.
- Knowledge transfer strategy with proposed skills and training based on system technical requirements.
- System User Manual
- System Administration Manual
- Facilitators' Training Guide

V. Proposal Requirements - Financial

Provide itemized costs for the total scope of this project, based on the scope of work and deliverables outlined in Section IV. Bids should include itemized costs for identified elements of the scope of work defined in the **Cost Breakdown Spreadsheet** attached and should be submitted in this template. The final scope of work may be subject to negotiation; however, bidder selection will be made against the original scope of work.

- Percent participation in total level of effort according to key staff.
- Rates of key staff.
- Estimated total level of effort and associated costs.
- Travel from outside Tanzania (if any) and associated costs.
- Itemization of all other costs (e.g., agency costs, agency fees, sub-contracted resources, administrative costs, supplies, tax, etc.).

Special Note on Indirect costs –
Indirect costs are overhead expenses incurred as a result of the project but not easily identified with the project's activities. These are administrative expenses that are related to overall general operations and are shared among projects and/or functions. Examples include executive oversight, existing facilities costs, accounting, grants management, legal expenses, utilities, and technology support.

<u>Indirect rate allowances</u>: These rates are maximum allowances. If the organization has lower rates, the lower rates should be used. To the extent that indirect costs are applicable, they are subject to the following limits:

- *Up to 15% per donor regulations – indirect rates must be substantiated by either a negotiated Indirect Cost Rate agreement with the donor or 3-years of audited indirect financial rates*
- *No indirect costs will be paid to US Government agencies, other private foundations and for-profit organizations.*
- *Rates apply both to the primary grantee, subgrantees, and subcontracts that are part of the proposal.*

Please note, in so far as possible, identifiable (allocable) costs should be documented and justified in the proposal as direct costs, including those for dedicated ongoing project management and support. Newly acquired facilities costs that can be allocable to the project are acceptable as direct costs.

VI. Proposal Template – Technical

Provide a narrative on your qualifications and approach to accomplish the scope of work and deliverables per Section IV, including:

Organizational Profile(s) and Experience (Max. 7 pages)	Overview of the organization or organizations in the consortium, including: • Profile of organization(s). • Year established and number of years' experience in software development and Geographic Information Systems (GIS). • Annual revenue • Profile of relevant experience, corporate qualifications, past clients, and examples of related work. This should include descriptions of experience in software development, in GIS, in using the technologies and tools that the responder is proposing to use in this project, and in implementing best practices in software project management. • If your company has more than one location, please indicate these qualifications for the site that is responding.
Technical Approach (Max. 8 pages)	• Technical approach to meeting the scope of work and the attached requirements outlined in the attached document. • Description of proposed platforms, tools, and technologies to be leveraged. • Software development approach including project management and quality control approach. • Potential risks and mitigating strategies to address potential obstacles.
Sustainability (Max. 2 pages)	• Approach to building capacity of the Government and ensuring capacity of local software organizations to provide long term support and maintenance, and further develop the software over time. • Proposed approach to source code openness and licensing. • Maintenance and support plan for the developed software solution.
CVs (Max. 1 page per CV, Max. 10 CVs)	• CVs of key personnel envisaged for different roles, including relevant skills and experience in software development and in GIS. For each CV, specify the relationship of the person with the organization, for example whether the person is a permanent employee or a sub-contracted consultant.
Project Plan (Max. 2 pages)	• Project management and roles of project team, including percentage of each person's time which will be allocated to this project. • Timeline to meet the deliverables.

VII. Proposal Evaluation Criteria

The following is a list of significant criteria against which proposals will be assessed. Please note the criteria weighting:

A. **Organizational Profile(s) and Experience (30 points)**
   - Demonstrated successful experience in similar projects and efforts.
   - Technical team with experience and skills to conduct the required work to achieve the scope of work.

B. **Technical Approach (30 points)**
   - Well described narrative on the approach to achieve the scope of work, including demonstration of an understanding of the requirements.
   - Identification of fit for purpose proposed technologies, tools, and platforms.
   - Overall timeline and work plan for project, including estimated dates of deliverable completion and narrative showcasing how milestones and deliverables will be met.
   - Software project management approach clearly outlined and explained.

C. **Sustainability plan**, including the plan to develop long term local capacity for software maintenance and further development needs (20 points).

D. **Costs** (as detailed in Section V) (20 points).

Note: PATH reserves the right to include additional criteria.

VIII. Instructions and Deadlines for Responding

A. PATH Contacts

Program Contact: Celia Lang clang@path.org
Procurement Contact: Keith Neroutsos kneroutsos@path.org

B. Fact-Finding Questions

Questions on this solicitation will be accepted via email to the contacts listed above through 1 June 2018. Questions and answers to all questions will be provided on 6 June 2018 to all participants who confirmed interest. Please note that responses will not be confidential except in cases where proprietary information is involved. Inquiries after this date cannot be accommodated.

C. Proposals Due: 15 June 2018

Completed proposals should be submitted by email to the contacts listed above. The subject line of the email should read: RFP # 2018-016 (lead organization name).

We advise that you send files in PDF or in commonly recognized MS formats. We will not accept responsibility for resolving technical transmission problems with proposals. A hard copy of the proposal should not be sent. Your proposal should only include information specific to accomplishing the scope of work. Additional information submitted outside of the proposal requirements will be reviewed at PATH’s discretion only. Elaborate materials, artwork or other information not directly related to the scope of work are not suggested.

D. Selection of Short-List

PATH reserves the right to select a short list from the bids received. PATH has the option to interview and discuss specific details with those candidates who are on the short-list.

E. Conclusion of Process

Applicants will be notified of PATH's decision by date. Final award is subject to the terms and conditions included in this solicitation, as well as successful final negotiations of all applicable terms and conditions affecting this work.

IX. Terms and Conditions of the Solicitation

A. Notice of Non-Binding Solicitation

PATH reserves the right to reject any and all bids received in response to this solicitation and is in no way bound to accept any proposal.

B. Confidentiality

All information provided by PATH as part of this solicitation must be treated as confidential. In the event that any information is inappropriately released, PATH will seek appropriate remedies as allowed. Proposals, discussions, and all information received in response to this solicitation will be held as strictly confidential, except as otherwise noted.

C. Conflict of Interest Disclosure

Suppliers bidding on PATH business must disclose, to the procurement contact listed in the RFP, any actual or potential conflicts of interest. Conflicts of interest could be present if; there is a personal relationship with a PATH staff member that constitutes a significant financial interest, board memberships, other employment, and ownership or rights in intellectual property that may be in conflict with the supplier's obligations to PATH. Suppliers and PATH are protected when actual or perceived conflicts of interest are disclosed. When necessary, PATH will create a management plan that provides mitigation of potential risks presented by the disclosed conflict of interest.

D. Communication

All communications regarding this solicitation shall be directed to appropriate parties at PATH indicated in Section VIII. A. Contacting third parties involved in the project, the review panel, or any other party may be considered a conflict of interest and could result in disqualification of the proposal.

E. Acceptance

Acceptance of a proposal does not imply acceptance of its terms and conditions. PATH reserves the option to negotiate on the final terms and conditions. We additionally reserve the right to negotiate the substance of the finalists' proposals, as well as the option of accepting partial components of a proposal if appropriate.

F. Right to Final Negotiations

PATH reserves the option to negotiate on the final costs and final scope of work, and also reserves the option to limit or include third parties at PATH's sole and full discretion in such negotiations.

G. Third-Party Limitations

PATH does not represent, warrant, or act as an agent for any third party as a result of this solicitation. This solicitation does not authorize any third party to bind or commit PATH in any way without our express written consent.

H. Proposal Validity

Proposals submitted under this request shall be valid for 90 days from the date the proposal is due. The validity period shall be stated in the proposal submitted to PATH.

Administrative Area Registry System (AReS)

Requirements Document

April 2018

Government of the United Republic of Tanzania

President's Office, Regional Administration and Local Government

Contents

Abbreviations

AReS	administrative area registry system
API	application programming interface
CSV	comma-separated values
GIS	geographic information systems
MLHHSD	Ministry of Lands, Housing and Human Settlements Development
PO-RALG	President's Office Regional Administration and Local Government

1 Introduction

1.1 Background

Administrative areas are the territorial units into which a country is divided; these areas are central to how administration and service provision are organized. In Tanzania mainland, administrative areas (e.g., regions, districts, wards, villages/*mitaa*) are key units for structuring government resource allocation and service provision.

Article 145 of the Constitution of the United Republic of Tanzania of 1977 declares:

> There shall be established local government authorities in each region, district, urban area and village in the United Republic, which shall be of the type and designation prescribed by law to be enacted by Parliament or by the House of Representatives.

In Tanzania, the President of the United Republic of Tanzania has the power to establish city councils, as stipulated in the Local Government (Urban Authorities) Act of 1982, Cap. 288. The Local Government (District Authorities) Act of 1982, Cap. 287 and Local Government (Urban Authorities) Act of 1982, Cap. 288 give the minister who is responsible for local government power to establish municipal, town, and districts councils after consultation with the President. Approved changes to local government areas must be published in the form of a Government Notice in the *Government Gazette*.

The ministry responsible for local government—the President's Office, Regional Administration and Local Government (PO-RALG)—is responsible for managing approved administrative areas and making information in these areas available to stakeholders. PO-RALG currently maintains lists and documents of administrative areas in paper copies, which are difficult to update and disseminate to stakeholders. It is also complex to trace the accuracy and authenticity of these documents.

The Ministry of Lands, Housing and Human Settlements Development (MLHHSD) has a mandate of mapping approved administrative areas. MLHHSD works with PO-RALG to allocate the area boundaries and to prepare maps. MLHHSD does not always complete full, timely surveys of administrative areas due to budget constraints. This may sometimes result in inconsistencies between MLHHSD and PO-RALG administrative area lists and data.

The Tanzania National Bureau of Statistics has mandate over government data and statistics, including making available data that are organized by administrative area. The National Bureau of Statistics uses a list of administrative areas from PO-RALG and mapped administrative areas from MLHHSD to prepare geographic information system (GIS) data on administrative area boundaries for use at census time. These GIS boundary data are not routinely updated when changes are made between censuses. Therefore, at a certain period between censuses, the National Bureau of Statistics' lists and data on administrative areas are inconsistent with data available from PO-RALG and MLHHSD.

Other government institutions use administrative areas to execute their mandated roles: The Tanzania Communications Regulatory Authority manages postcodes, which are based on wards. The National Electoral Commission administers parliamentary elections by grouping wards into constituencies; wards are the voting units for councilors in local government elections. The eGovernment Agency provides technical support and guidance for government information and communication technology projects.

Many other government ministries, departments, and agencies; local government authorities; and nongovernment stakeholders independently maintain lists of administrative areas due to the lack of an accessible and updated authoritative source. This leads to inconsistencies and inaccuracies in these data across different datasets and data systems. This also results in duplication of the work of each institution in updating, correcting, and maintaining these lists.

Lack of a single reliable, accessible, and continually updated source of administrative area data has led to constraints and challenges across multiple sectors, including health, water and sanitation, education, natural resources, agriculture, postal services, and election administration. PO-RALG has noted these challenges and plans to address them by implementing an electronic Administrative Area Registry System (AReS) through Data Use Partnership (DUP) Project. The electronic administrative area registry system will be implemented collaboratively by multiple government institutions under the leadership of PO-RALG.

1.2 Purpose

The purpose of this document is to present a description of the Administrative Area Registry, a system that will be developed to address many of the challenges mentioned above. This document will explain the purpose and features of the administrative area registry, how it will interface with external systems, and the data that it will need to store and process.

These system requirements were developed during a collaborative requirements development workshop that took place in April 2018 in Dodoma. Officials from government ministries, departments, and agencies and local government who have a stake in the Administrative Area Registry were involved in this workshop.

2 User stories

The following user stories illustrate the vision for the Administrative Area Registry after it has been developed and implemented.

2.1 Managing administrative area lists and boundaries

As a PO-RALG official, I want to record changes to administrative area lists and digital boundaries in the administrative area registry whenever changes to administrative areas are approved. This will ensure that the Administrative Area Registry is up to date.

As a PO-RALG official, I want to upload documents related to one or more administrative area changes—for example Government Notices, survey documents, and certificates of establishment—so that all documentation of changes are accessible.

As a PO-RALG official, I want to use provisional demarcated surveys from district surveyors to record the boundaries of the lowest-level mapping areas in the registry. Later, I want to update them, as necessary, when official surveys are approved by MLHHSD, so that I do not delay the release of changes.

As a PO-RALG official, I want to record lists of non-mapped areas (e.g., Kitongoji) within the lowest-level mapping areas so that they are also included and made available in the administrative area registry.

2.2 Submitting and tracking proposals to change administrative areas

As a subnational official, I want to submit proposals to change administrative areas into the administrative area registry in the form of notes and documents, such as minutes of meetings and provisional survey documents, so that they can be reviewed and processed by higher-level authorities.

As a council surveyor, I want to upload provisional survey documents to the administrative area registry as part of area change proposals so that PO-RALG can understand the changes being proposed more accurately.

As a subnational official at the higher levels of the hierarchy, I want to review and attach further documents and notes to the area change proposals so that a PO-RALG officials can view, organize, and track these area change proposals.

2.3 Using the administrative area lists and boundaries

As a user (e.g., citizens, government departments, researchers, nongovernmental organizations, development partners, and the private sector), I want to access up-to-date lists and maps of administrative areas from the administrative area registry at any time so that I can see current and past administrative areas (dating from 2018).

As a user, I want to view relevant publicly available documents, such as Government Notices and official surveys, related to administrative areas.

As a user, I want to access data regarding a particular area that are contained in other systems (e.g., population data or maps of service points).

As a user, I want to subscribe to email updates so that I get notified when an administrative area change takes place.

As a software developer, I want to electronically link other systems with the administrative area registry to incorporate administrative area lists and boundaries into the other systems through application programming interfaces (APIs). This would enable me to use lists and boundaries from the administrative area registry in other systems.

As a software developer, I want to link my system with the administrative area registry so that I can display data in my system visually in maps. Thus, my datasets can be more useful and visual to their users.

As a local or central government official, I want to use the administrative area registry when planning and administering any interventions and activities that are organized by administrative area, such as health, water, sanitation, education, agricultural extension services, and revenue collection. This would make my planning more informed.

As a planner or land official, I want to use the administrative area registry to help structure and inform land planning processes and infrastructure planning so that my planning is more informed.

As an official in the National Bureau of Statistics, I want to use the administrative area registry lists and boundaries as the starting point for establishing enumeration areas for census and other surveys so that my survey data are better organized and in line with administrative areas.

As an official in the National Electoral Commission, I want to use the administrative area registry ward lists and boundaries to support local government elections. I also want to use it as a starting point to specify parliamentary constituencies (which are groupings of wards) so that lists and boundaries reflect the reality on the ground.

As an official in the Tanzania Communications Regulatory Authority, I want to use the administrative area registry to manage postal codes so that I refer to accurate administrative areas.

As an official in the Ministry of Natural Resources and Tourism, I want to use the administrative area registry to see boundaries between administrative areas and protected conservation and wildlife areas so that I can prevent land disputes that may occur.

As a user of other registries and systems that map service points (including the health facility registry and water point mapping systems), I want these registries to be automatically notified about changes to administrative areas. This would enable the re-assignment of service points to their new areas.

2.4 Providing feedback

As a user (from the general public or from government), I want to use a feedback form to provide feedback on the administrative area registry, such as appreciation of how the registry benefits me, suggestions for new or improved interface features, reports of system bugs or performance problems, and reports of possible inaccuracies in information about areas in the registry.

As a citizen, I want to be informed of the process to follow if I want to propose a change to an administrative area so that I know how to propose changes.

As a PO-RALG official, I want to view, organize, and track this feedback so that I can provide responses and find solutions.

3 Requirements

3.1 Data requirements

The administrative area data that should be stored in the Administrative Area Registry include:

- Area ID (assigned by system)
- Area name
- Area type
- Area level
- Parent area ID
- Description
- Other area codes (one code for each coding scheme)
- Boundaries (in the case of mapping areas only)
- "Valid from" date
- "Retired from" date

Links between areas and documents should also be stored (one document can be linked to multiple areas; and one area may be linked to multiple documents). These links show to which areas the document relates.

Document metadata that should be stored in the Administrative Area Registry include:

- Document ID
- Document name
- Document format (e.g., PDF)
- Document type (e.g., Government Notice, Certificate of Establishment, provisional survey, approved survey)
- Source
- Release date

User information that should be stored in the Administrative Area Registry include:

- First name
- Last name
- Password
- Organization
- Designation (i.e., job title)
- Links to assigned areas
- Mobile phone number
- Email address
- Status (e.g., enabled/disabled)
- "Valid from" date
- "Valid to" date
- Role(s)
- Data on each area change proposal should include the area(s) the proposal relates to, notes/remarks on the proposal, document links to the proposal, and the status of the proposal.
- The type of feedback received and the feedback notes should also be stored.

The registry should cater for the current administrative structure in mainland Tanzania and also cater for changes in future. The current administrative structure in mainland Tanzania is described in Annex A.

3.2 Functional process requirements

3.2.1 User management

- The system should provide password-protected and role-based access to the system. See Annex B for sample roles.
- The system should allow the high-level administrative user to create user roles and assign specific permissions to those roles. Some permissions should be high level and some should be based on area; for example, an area-based permission grants permissions only with respect to a particular area and areas under it in the hierarchy. See Annex B for a list of permissions.
- The system should allow the user to self-register to obtain login credentials.
- The system should allow the user to change their password.
- The system should allow the user to recover or reset their own password if they forget it.
- The system should allow the user to update their basic information (e.g., contact information).
- The system should allow the user to configure their own email notification settings.
- The system should allow an administrative user to register a new user (as an alternative to self-registration) and send a notification email to the registered user with login details.
- The system should allow the administrative user to reset a password of a particular user (who is in or under the administrative user's area).
- The system should allow the administrative user to disable/enable a particular user (who is in or under the administrative user's area).
- The system should allow the administrative user to allocate roles to registered users. In the case of area-based roles, the administrative user can only grant those roles with respect to his/her own area or areas under it.

3.2.2 Area change proposals

- The system should allow a user to propose area changes by specifying one or more existing area(s) that they are proposing to change, providing a description of the proposed change and its source, and uploading relevant documents (e.g., minutes of meetings); each document should have a title, document type, and document date.
- The system should allow other users to attach additional documents and notes/comments to proposed changes.
- The system should allow a user to "void" notes or documents that they submitted themselves.
- The system should allow users with the right permissions to void notes or documents that are submitted by others.
- The system should notify or alert the users at higher nodes of the hierarchy of the proposed changes, in accordance with the users' notification settings.
- The system should allow the user to track and update the status of an area change proposal (examples of statuses include: "Submitted" [default status]), "Void—mistake or duplicate," "Further documentation required," "Under review," "Accepted," and "Rejected").

3.2.3 Updating areas

- The system should allow the user to specify which type of change they are making:
  - Changes for the purpose of a new decision.
  - Corrections.

- The system should allow the user to specify a “Valid from” date of the changes they are proposing (i.e., the date that the changes became valid); where possible, the system should specify the “Valid to” date.
- The system should allow the user to make individual changes to multiple areas in such a way that the changes are visible and printable to the user but not yet visible to the public until the batch of changes is checked and published as a whole.
- The system should allow the user to create new areas and specify a name, type, level, and parent area.
- The system should allow the user to provide a description of the area as free text.
- The system should allow the user to enter other codes (i.e., codes that are used by other systems or documents to identify a particular area).
- The system should allow the user to change boundaries of areas by merging, splitting, expanding, and reducing areas.
- The system should allow the user to move child areas from one parent area to another.
- The system should allow the user to record the status of the boundaries of lowest-level mapping areas as “Provisional” or “Approved.”
- The system should allow the user to specify a list of non-mapped areas within a lowest-level mapping area.
- The system should allow the user to specify a list of child areas that are not yet mapped within an area if the provisional child area maps are not yet available.
- The system should allow the user to attach public documents to areas, including recording the document title, type, and date.
- The system should allow the user to include all related changes as a batch and submit for approval as a batch.
- The system should run consistency checks to ensure that boundaries and data are consistent and that all hierarchy rules are adhered to when the user submits a batch of changes.
- The system should allow the user to roll back a batch of changes before publication.
- The system should allow the user to print or export the area lists in an unpublished batch in a format suitable for inclusion in a draft Government Notice.
- The system should allow the user to upload the signed decision document (Government Notice) and record the date that it was signed/issued.
- The system should allow publication of an approved batch of changes.

3.2.4 Feedback

- The system should allow unregistered users to provide feedback anonymously.
- The system should allow unregistered users to provide feedback and specify personal information (e.g., name, email, address, and phone number).
- The system should allow registered users to provide feedback and send acknowledgment to a registered email address.
- The system should allow the user to select the type of feedback from a list (e.g., “How the registry was useful to me;” “System performance problems or defects;” “Feature requests for the registry;” and “Report of possible data inaccuracy”).
- The system should have a place that explains how to raise area change proposals through their local government authorities.
- In the feedback form, the user should be able to submit free-text feedback.
- The system should send notification and alerts to core users who have been configured to receive notifications of all submitted feedback.

- The system should allow the core user to respond to received feedback and to change the status of the feedback (e.g., "Void/spam," "Submitted" [default status], "Under review," "Reviewed—no action needed," "Reviewed—action needed," and "Action taken").
- The system should capture the date the feedback was received and dates of status changes.

3.2.5 Notifications and alerts

- The system should allow the user to specify the type and frequency of notifications that they would like to receive.
- The system should display new notifications to the user after they log in to the system.
- The system should allow the administrative user to specify which email address should receive system notifications.
- The system should provide area change notifications to subscribed users when new decisions (Government Notices) are issued and changes published, when corrections are made, and when new public documents are uploaded.
- The system should provide area change proposal notifications to relevant core users when area change proposals are submitted, when new comments or supporting documents are uploaded, and when the area change proposal status has changed.
- The system should provide feedback notifications to core users when feedback is submitted, and to feedback submitters when the feedback is responded to or the feedback status changes.

3.3 Outputs: visualization, summary, and search requirements

- The system should allow both registered and unregistered users to:
  - View current lists of administrative areas.
  - View lists of administrative areas as they were in previous states. For example, if the initial administrative areas in 2018 are changed through new Government Notices in 2019 and again in 2020, options will be available to view the 2018 data, the 2019 data, and the 2020 data. Corrections made will be back-dated to the time that the data were valid.
  - Display administrative areas as zoomable maps.
  - Display different types of administrative areas in different colors or styles.
  - Display provisional and approved boundaries in different colors or styles.
  - Drill down on the map or the list to access different levels of the hierarchy, including drilling down through specific levels (e.g., only central government levels or only local government levels).
  - Search and sort areas in the registry using different criteria.
  - Search and sort public documents in the registry using different criteria.
  - Download single or multiple documents at a time.
  - Preview submitted documents without need for download.
  - Export and download lists of administrative areas as Excel, PDF, or comma-separated values (CSV) formats.
  - Export and download boundary data in image files and GIS formats.
  - View area details, including area name, type, level, size, and "Valid from" date.
  - View public documents associated with an area.
  - Access other linked information located in other systems.
- The system should allow the user with relevant permissions to export draft lists of revised areas before they are published, into formats suitable for inclusion in a draft Government Notice.
- The system should allow core users with relevant permissions to:
  - View lists of area change proposals.
  - Search area change proposals using different criteria.
  - Search documents related to area change proposals using different criteria.

- Download single or multiple area change proposal documents at a time.
- View and print full details of a particular area change proposal, including all notes/comments associated with the area change proposal, lists of attached documents, and the status of the area change proposal.

- The system should allow core users with relevant permissions to view a list and summary of feedback received.
- The system should display summaries of system usage by different types of registered users, by nonregistered users, and by external system applications—for example:
  - Which external system accessed which information.
  - How frequently different features were used.
  - Report on a specific user: last time user logged into the system, what activities the user performed in the system, etc.
  - Audit trail information in an analyzable format.

3.4 Configuration

- The system should allow the user to set up different types, levels, and hierarchy structures of administrative areas (see Annex A for current structure), so that if this structure changes in future, the system can be configured without need for recoding.
- The system should allow the user to configure which levels are "lowest mapping" levels in particular hierarchy branches and which levels are "unmapped" (e.g., specifying that villages and township authorities contain *Kitongoji*, which are unmapped but listed; specifying that *mitaa*, special conservation, and investment areas are lowest-level mapping areas).
- The system should allow the user to configure different area coding schemes.
- The system should allow the user to configure a list of document types for public documents (e.g., Government Notice, Certificate of Establishment, approved survey, etc.) and a list of document types for area change proposal attachments (minutes of meeting of village council, minutes of meeting of ward development committee, provisional survey, etc.).
- The system should allow the user to configure status options for tracking area change proposals.
- The system should allow the user to configure a list of feedback types.
- The system should allow the user to configure status options for tracking feedback.
- The system should allow the text and images on web pages to be configurable and dynamically changed by the user in simple manner.

3.5 Communication with external systems and application programming interface

- The system should make data available to other systems through a standards-based API.
- The system should communicate with other systems through APIs.
- The registry should be able to extract data from other systems through APIs and make them available in the system, including:
  - Spatial data (e.g., geographical features, satellite imagery, natural resources area maps, other available GIS datasets).
  - Service points (e.g., health facility registry).
  - Other datasets (e.g., population data) in other systems.
- The system should be able to connect and communicate through the PO-RALG Muungano Gateway Interoperability layer or any other government enterprise service bus.

3.6 Audit trail and logs

- The system should keep a log of system logins and logouts.

- The system should keep a log of changes made to the records; the log should comprise who made the change and a time stamp of when the change was made, including:
  - All updates to areas and uploads of associated documents, and all publications of batches of updates.
  - All notes and documents submitted as part of area change proposals, and all status changes.
  - All feedback status changes.
- The system should log usage of different search, summary, and visualization features by both registered and nonregistered users (i.e., page hits).
- The system should log all access to its API and API transactions.
- The system should log all errors.

3.7 Usability

- The system should be intuitive and easy to understand and use so that end users are able to train other end users.
- The public interface to the registry should be accessible through a web browser, should work on all major web browsers, and should display well on small screens (e.g., smartphones).
- The system should provide informative error messages.
- The system should alert for ongoing and completed processes rather than run invisibly in the background with no feedback to the user.
- The system should be able to roll back a batch of draft updates to areas if the full update was not completed successfully.

3.8 Other

- The system should be able to store data, including boundary data, on hundreds of thousands of areas (to include current and future areas).
- The system should be able to accommodate at least 30,000 concurrent users accessing data on a read-only basis.
- The system should allow the user to upload seed data from a file and record a "Valid from" date of uploaded data.

4. Annex A. Administrative area structure in mainland Tanzania

4.1 Central government structures

Regions contain districts. The next level under a district in the central government structure is a division.

4.2 Local government structures

Some districts have one council (local government authority), whereas other districts have two or even three councils/local government authorities—an urban council that covers an urban area, which is often an "island" in relation to the broader rural council area. The area of the rural council covers the surrounding rural area only and not the urban council island within it.

- Rural councils
  - A. District councils (*Halmashauri ya Wilaya* in Kiswahili), which contain:
    1. Wards (*kata* in Kiswahili), which contain:
       - a. Villages (*kijiji*, plural *vijiji*, in Kiswahili), which contain:
         - i. *Kitongoji* (plural *vitongoji*)
    2. Township authorities (*Mamlaka ya Mji Mdogo* in Kiswahili), which contain:
       - b. Wards, (Kiswahili: Kata) which contain:
         - ii. *Kitongoji* (plural *vitongoji*)
- Urban councils
  - A. City councils (*Halmashauri ya Jiji* in in Kiswahili), municipal councils (*Halmashauri ya Manispaa* in Kiswahili), and town councils (*Halmashauri ya Mji* in Kiswahili), which contain:
    1. Wards, (Kiswahili: Kata) which can contain:
       - a. *Mtaa* (Singular: Mtaa, plural *Mitaa*).
       - b. Villages, (Kiswahili: Kijiji, plural Vijiji) which contain:
         - i. *Kitongoji* (Singular: Kitongoji, plural *Vitongoji*)
- An exception to the structure above is the Dar es Salaam city council, which is an umbrella council for the municipal councils within it. Umbrella councils exist for coordination purposes and do not have their own area in the way that other councils have.

While *Kitongoji* are in this structure, the intention is not to map these in the administrative area registry. Rather, the lowest-level mapped areas will be villages (most rural areas), wards (rural areas under township authorities), and *mitaa* (urban areas). *Vitongoji* can be listed in the registry but not mapped. The lowest mapping level will be configurable in the system, so if maps of *vitongoji* become available in the future, the lowest mapping level settings can be adjusted accordingly.

4.3 Special areas

Some areas have special gazetted status for wildlife and conservation purposes or for large economic investments. These areas are under the mandate of the Ministry of Natural Resources and Tourism or the Ministry of Industry and Trade. These areas do not fall within villages or wards; rather, they border villages and wards. However, these areas do form part of the area of a council, district, or region. Some special areas fall entirely within one council. Some larger special areas cover multiple councils, districts, or regions. However, for the purposes of the registry, different segments of one special area can be regarded as different areas. In other words, larger special areas may contain several area segments, each in a different council area.

Special area segments will also be a lowest-level mapping area within the registry.

4.4 Area hierarchies

Figures 1 and 2 below illustrate how the areas fit within each other, with the black lines indicating that a lower area is contained within a higher area. However, it should be noted that the central government structures (in dark blue) and local government structures (in light blue) are separate hierarchies. For this reason, the administrative area registry interface should be able to drill down directly from council to ward or township authority levels when in a “Local government areas” mode.

Figure 1. English-language area hierarchy diagram.

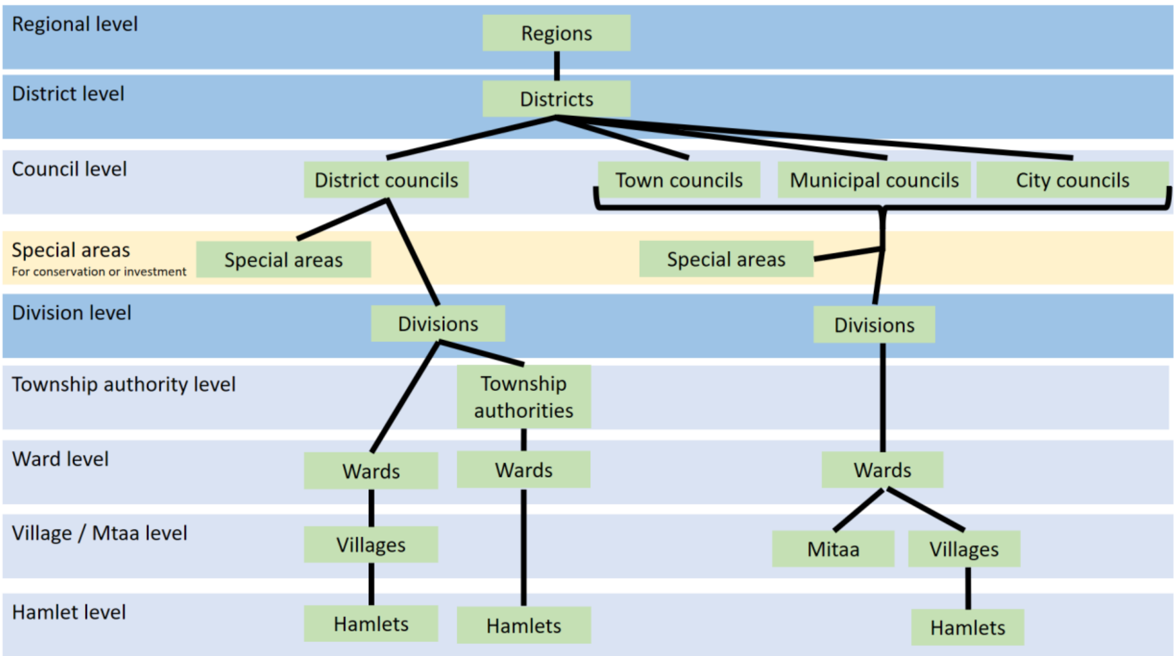
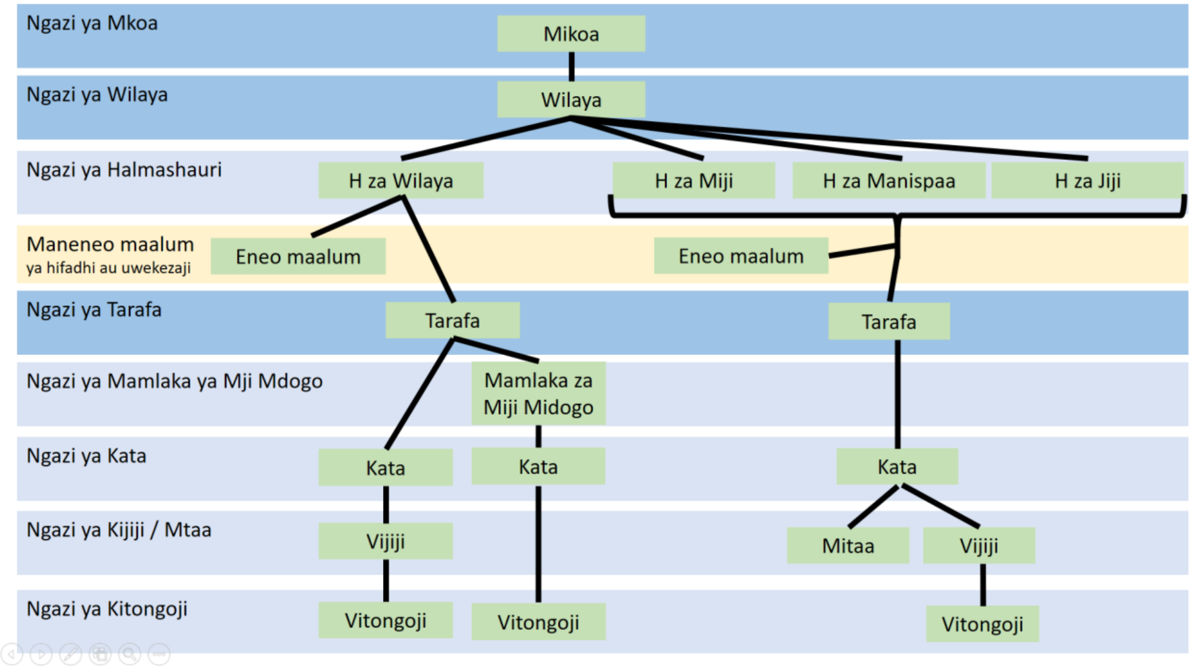


Figure 2. Kiswahili-language area hierarchy diagram.



5. Annex B. Roles and permissions

Levels/organizations	**Users**	**Overall roles** **vis-à-vis administrative areas**	**System roles in Administrative Area Registry System (AReS)**

Ministry: President's Office, Regional Administration and Local Government	Permanent Secretary,
	Director of Regional Administration,
	Director of Local Government,
	PO-RALG officers,
	PO-RALG GIS experts
		• Set, review, and update criterion for administrative areas registration
		• Receive and review area change proposals from regional level
		• Verify and approve area change proposals from regional level
		• Consult President on area change proposals at council, district, and regional levels
		• Draft Government Notices for Minster's signature
			• High-level user administration
			• Configuration
			• Manage area change proposals including:
			  ○ View area change proposals
			  ○ Receive notifications about new area change proposals and new documents uploaded/notes submitted
			  ○ Submit comments, upload documents related to area change proposals
			  ○ Update the status of area change proposals
			• Update administrative area lists and boundaries in administrative area registry, including:
			  ○ Making corrections to lists and boundaries when needed
			  ○ Printing draft Government Notices for signature and uploading signed Government Notices
			  ○ Publishing changes
			  ○ Uploading public documents related to administrative areas
			  ○ Making corrections to boundaries and uploading approved boundary maps from Ministry of Lands, Housing and Human Settlements Development when available
			• Review feedback, receive notifications about feedback, and update status of feedback
			• Use search, sort, visualization, and export features for administrative area lists, boundaries, and public documents
			• Work with other systems and their developers to provide access to other data in other systems via links from the AReS

Levels/organizations	**Users** 	**Overall roles** **vis-à-vis administrative areas**	**System roles in Administrative Area Registry System (AReS)**
Subnational: regions, districts, councils, divisions, township authorities, wards, villages/*mitaa*	Regional Administrative Secretariat, District Executive Director, Councilor, Council Surveyor, Division Officer, Ward Executive Officer, Village Executive Officer, *Mtaa* Executive Officer	• Schedule and conduct meetings (regional consultative meetings, district consultative meetings, council management team meetings, full council meetings, division protection and security committee meetings, ward development committee meetings, village council meetings, village assembly meetings) • Prepare minutes of meetings related to proposals to change administrative areas • Review area change proposals received from lower levels • Council only: Prepare provisional surveys	• User administration of users within the area and areas under it • Submit and review area change proposals, including: ○ Viewing area change proposals ○ Receiving notifications about new area change proposals and new documents uploaded/notes submitted ○ Submitting new area change proposals ○ Submitting comments related to area change proposals ○ Uploading documents related to area change proposals (in the case of councils, this will include uploading provisional surveys) • Use search, sort, visualization, and export features for administrative area lists, boundaries, and public documents • Receive notifications about changes to administrative areas after publication • Give feedback on system performance/content

Levels/organizations	**Users** 	**Overall roles** **vis-à-vis administrative areas**	**System roles in Administrative Area Registry System (AReS)**
Others: government institutions, private and nongovernmental organizations, citizens	Government official, researcher, development worker, citizen	• Use administrative area lists and boundaries to plan and organize their work, and to organize their data • Citizens need to understand administrative area structures to participate effectively in governance and access services.	• Use search, sort, visualization and export features for administrative area lists, boundaries and public documents • Receive notifications about changes to administrative areas after publication • Give feedback on system performance/content • Connect other systems to the AReS API so that other systems are updated with AReS lists and boundaries • Connect other systems to the AReS in order to make data in other systems accessible via the AReS

List of permissions:

- Permissions to subscribe to email notifications about area changes (granted to all users by default).
- Permissions to submit feedback (granted to all users by default).
- Permissions to submit, view, document, and comment on proposed area changes (in the form of notes and attached nonpublic documents). These permissions will be area-based (i.e., permissions to submit, view, and comment on only the area change proposals that are related to areas under the user's area in the hierarchy).
- Permissions to delete (void) documents or comments submitted by others.
- Permissions to change the status of area change proposals.
- Permissions to perform updates on areas.
- Permissions to view batches of unpublished changes.
- Permissions to upload public documents on areas.
- Permissions to publish updates and public documents.
- Configuration permissions.
- User management permissions, both general and area-based.