

## TERMS OF REFERENCE

### Drone-Based Vector Monitoring in Marshlands

*High-Resolution Aerial Habitat Mapping using Unmanned Aerial Vehicles (UAVs) to Support Rift Valley Fever and Malaria Vector Surveillance in Rwanda*

<b>Issued by</b>	Clinton Health Access Initiative (CHAI) – Rwanda
<b>In support of</b>	Rwanda Biomedical Centre (RBC)
<b>Type of procurement</b>	Open competitive tender – Request for Proposals (RFP)
<b>Date of issue</b>	June 04, 2026
<b>Submission deadline</b>	<b>June 28, 2026 before 05:00PM local time</b>

## **1. Background and Context**

Rwanda continues to face a significant burden of vector-borne diseases, with malaria and Rift Valley Fever (RVF) representing two of the most important threats at the human–animal–environment interface. Marshlands irrigated agricultural areas, and wetlands along the Akagera, Akanyaru, and Nyabarongo watersheds constitute highly productive ecological niches for mosquito vectors of these diseases. These environments are widely distributed, dynamic, and operationally difficult to monitor using ground-based methods alone.

The Rwanda Biomedical Centre (RBC), through the Public Health Surveillance and Emergency Preparedness Division, specifically the One Health Unit, leads national vector surveillance and control activities. RBC operates 13 sentinel surveillance sites distributed across high-risk districts where entomological and epidemiological data are routinely collected to inform integrated vector management.

To strengthen the precision, timeliness, and spatial coverage of vector surveillance, RBC, with support from the Clinton Health Access Initiative (CHAI), is introducing drone-assisted (UAV) aerial habitat mapping of the broader sentinel surveillance programme. This component is intended to complement, not replace, ground-based entomological surveillance.

## **2. Rationale and Innovation**

High-resolution aerial imagery acquired through UAVs offers a cost-effective and rapidly deployable means of mapping mosquito breeding habitats at landscape scale. Drone-derived orthomosaics, digital surface models, and habitat classification maps allow programme managers to:

- Identify standing water, flood-prone depressions, and seasonally inundated areas that are inaccessible on foot.
- Detect drainage patterns, micro-habitats, and vegetation structures (e.g., papyrus, shrubs, irrigation channels) associated with vector breeding and resting.
- Prioritise zones for ground-truthing, larval source management, indoor residual spraying, and community sensitisation.
- Provide georeferenced visual evidence to support intervention planning, monitoring, evaluation, and reporting.

This approach builds on established international best practice in drone-based public health surveillance and on prior malaria control collaborations conducted in Rwanda. The intervention is fully aligned with Rwanda's National Malaria Strategic Plan, the National Action Plan for Health Security (NAPHS), the One Health Strategic Plan (ROHSP), and the Rwanda Civil Aviation Authority (RCAA) UAV regulatory framework.

### 3. Objectives of the Assignment

#### 3.1 Overall Objective

To conduct systematic, high-resolution drone-based aerial mapping of mosquito breeding habitats in selected marshlands surrounding RBC's 13 sentinel surveillance sites, in order to strengthen evidence-based vector surveillance and control in Rwanda.

#### 3.2 Specific Objectives

1. To deploy fixed-wing and/or multi-rotor UAV platforms to acquire high-resolution RGB aerial imagery over priority marshlands and wetlands.
2. To process the acquired imagery into orthomosaics, digital surface models (DSMs), and habitat classification maps using standard photogrammetry workflows.
3. To identify, map, and characterise mosquito breeding habitats and environmental risk features in the surveyed areas.
4. To deliver all processed datasets through a centralised digital platform accessible to RBC and authorised stakeholders.
5. To build institutional capacity at RBC for the interpretation and operational use of UAV-derived geospatial data in vector surveillance and response.

### 4. Scope of Work

The selected service provider shall undertake the following activities under the technical oversight of RBC and CHAI:

#### 4.1 Drone Operations and Coverage

Both fixed-wing and multi-rotor UAV platforms shall be deployed to conduct systematic aerial surveys over marshlands surrounding the 13 sentinel sites. Survey design shall be informed by entomological priorities, seasonal hydrology, and accessibility constraints. The service provider shall:

- Develop a detailed mission plan including flight paths, altitude, ground sampling distance (GSD), overlap, and safety contingencies.
- Coordinate with the Rwanda Civil Aviation Authority (RCAA) and local authorities to secure all required flight authorisations and community engagement.
- Conduct field operations in compliance with national UAV regulations and international safety standards.

#### Priority Geographic Areas

**Kamonyi District:** Karama, Gacurabwenge, Rigalika.

**Ngoma District:** Rukumberi, Zaza, Sake, Kazo, Jarama.

Additional sentinel-site catchments may be added during contract execution, subject to mutual agreement between RBC, CHAI, and the service provider.

#### **4.2 High-Resolution RGB Imaging**

UAV platforms shall be equipped with high-resolution RGB sensors capable of delivering imagery suitable for environmental and entomological analysis. Minimum technical expectations include:

- Ground sampling distance (GSD) of  $\leq 5$  cm/pixel for priority breeding-site zones.
- Adequate forward and side overlap to support photogrammetric reconstruction (typically  $\geq 75\%$  /  $65\%$ ).
- Accurate geo-referencing using ground control points (GCPs) and/or PPK/RTK workflows where appropriate.
- Outputs suitable for orthomosaic generation, 3D surface modelling, and habitat classification.

In addition, the availability of multispectral and/or near-infrared (NIR) sensors would be considered an added advantage, as these technologies can improve the discrimination of standing water, vegetation moisture, and turbid mosquito breeding sites

#### **4.3 Frequency, Data Processing, and Platform Delivery**

Drone missions shall be conducted biannually, aligned with peak vector activity periods (rainfall and flood-recession seasons). Captured data shall be processed into georeferenced outputs using standard photogrammetry workflows and shall include:

- Orthomosaics (GeoTIFF).
- Digital Surface Models (DSM) and, where relevant, Digital Terrain Models (DTM).
- Habitat classification maps and risk-zone shapefiles.
- Mission metadata, accuracy reports, and field logs.

All processed data shall be delivered through a locally hosted digital platform that enables:

- Centralised access to maps and analytical insights by authorised RBC and CHAI users.
- Easy visualisation of breeding hotspots and seasonal change detection.
- Real-time sharing of actionable intelligence with relevant stakeholders.
- Interoperability with RBC's existing platforms (e-IDSr/DHIS2) where technically feasible.

#### **4.4 Capacity Building and Knowledge Transfer**

The service provider shall:

- Train designated RBC, district, and partner staff (minimum 10 participants) on platform use, basic interpretation of UAV-derived outputs, and integration of results into routine vector surveillance.
- Provide user manuals, standard operating procedures (SOPs), and metadata documentation.

- Hand over all raw and processed data, source files, and platform administrative rights to RBC at contract close-out.

## 5. Summary of Drone Activities

Drone Activity	Frequency	Output
Marshland aerial mapping	Biannually	High-resolution orthomosaics and habitat maps
Visual habitat analysis	Biannually	Breeding-site identification and risk-zone delineation
Digital platform updates	Continuous	Updated dashboards, layers, and stakeholder reports
Capacity-building sessions	At least 2 sessions	Trained RBC and partner personnel; SOPs and user manuals

## 6. Expected Deliverables and Timeline

The service provider shall produce the following deliverables in accordance with the agreed work plan. The exact dates shall be confirmed in the inception report:

#	Deliverable	Indicative Timeline (from contract signature)
D1	Inception report (methodology, mission plans, risk register, work plan, GCP strategy)	Within 2 weeks
D2	RCAA authorisations, community engagement records, safety documentation	Within 4 weeks
D3	First round of aerial surveys completed; raw imagery transmitted	Within 3 months
D4	First processed outputs (orthomosaics, DSM, habitat maps) and field report	Within 4 months
D5	Digital platform deployed, populated, and accessible to RBC/CHAI	Within 5 months
D6	Second round of aerial surveys and processed outputs	Within 9–10 months

#	Deliverable	Indicative Timeline (from contract signature)
D7	Final technical report, all datasets, handover documentation, and platform administration	Within 11-12 months

**7. Duration of the Assignment**

The assignment is expected to be implemented over a period of twelve (12) months from the date of contract signature, with the possibility of extension subject to performance, programmatic need, and availability of funding.

**8. Reporting and Coordination Arrangements**

The service provider shall report to CHAI Rwanda, working in close coordination with the Rwanda Biomedical Centre (RBC). Day-to-day technical supervision shall be provided by RBC's designated focal point in the One Health Unit. The service provider shall:

- Submit monthly progress updates and a quarterly technical report.
- Attend coordination meetings as required.
- Promptly notify CHAI and RBC of any operational, safety, or regulatory issues.

**9. Eligibility and Minimum Qualifications**

This is an open competitive tender. Applicants must be legally registered entities authorized to conduct UAV operations in Rwanda and must meet the following minimum eligibility criteria:

**9.1 Legal and Administrative Standing**

- Valid certificate of business registration (or international equivalent), with legal authority to operate in Rwanda.
- Valid tax clearance certificate or equivalent good-standing documentation.
- No record of conflict of interest, debarment, blacklisting, or ongoing legal proceedings that would prevent performance of the contract.

**9.2 Relevant Experience in Vector Surveillance or Public Health Mapping**

Minimum of five (5) years of demonstrated experience in environmental, agricultural, public-health, or vector-related mapping, with practical involvement in habitat or land-use characterisation. Direct experience in Rwanda or in comparable ecological settings (East African wetlands, irrigated marshlands) shall be considered an asset.

### **9.3 Proven Experience in Aerial Mapping**

Demonstrated expertise in drone-based high-resolution mapping, including:

- Acquisition and processing of geospatial data using fixed-wing and/or multi-rotor UAV platforms.
- Production of orthomosaics, digital surface models, and terrain models.
- Delivery of accurate, georeferenced outputs suitable for environmental and public-health analysis.

### **9.4 Experience in Habitat Detection and Environmental Analysis**

Proven capability in identifying and mapping features relevant to mosquito breeding, including:

- Standing water and flooded depressions.
- Irrigation channels and marshland edges.
- Vegetation zones (papyrus, shrubs) associated with vector activity.

### **9.5 Regulatory Compliance**

The applicant must hold (or commit to obtaining prior to mobilisation) a valid Unmanned Aircraft Operator Certificate (UOC) issued by the Rwanda Civil Aviation Authority (RCAA) and must demonstrate full compliance with national UAV regulations, including insurance, airspace coordination, and data-protection requirements.

### **9.6 Qualified Personnel**

The applicant shall make available a multidisciplinary core team, including at a minimum:

- A Team Leader / Project Manager with at least seven (7) years of experience leading UAV-based mapping or environmental projects.
- A Licensed drone pilot(s) with at least five (5) years of professional experience in UAV operations, aerial mapping, and field deployment in Rwanda or similar operational environments.
- A GIS and remote-sensing specialist(s) with at least five (5) years of professional experience in geospatial data processing, orthomosaic production, terrain modelling, habitat mapping, and spatial analysis.
- An Environmental, entomology, or public-health data analyst(s) with practical experience supporting vector surveillance, environmental monitoring, or malaria-related programmes.
- A Software/platform developer(s) with demonstrated experience in deploying and maintaining geospatial digital platforms or dashboards.

### **9.7 Operational Readiness**

Proven ability to safely conduct drone operations in challenging environments such as wetlands, marshlands, and remote rural settings, with adequate logistical, planning, and safety arrangements.

## 9.8 Past Performance

Submission of at least two (2) similar completed projects within the last five (5) years demonstrating experience in:

- Aerial mapping using UAV platforms.
- Habitat or environmental feature identification.
- Environmental or public-health monitoring.

Each reference project must be supported by evidence (e.g., completion certificates, contracts) and verifiable client references.

## 9.9 Joint Ventures and Consortia

Joint ventures and consortia between qualified national and international firms are permitted, provided that a lead entity is clearly designated and that the consortium agreement is submitted with the proposal. Subcontracting of specialised activities is allowed subject to prior disclosure and approval by CHAI.

## 10. Evaluation Criteria

Proposals shall be evaluated using a two-stage process: (i) eligibility/compliance screening and (ii) combined technical and financial evaluation, weighted as follows:

<b>Evaluation Criterion</b>	<b>Maximum Score</b>	<b>Weight</b>
<b>Technical Proposal</b>	<b>100</b>	<b>70%</b>
Relevant firm experience in UAV mapping for environmental or public-health applications	20	
Qualifications and experience of the proposed team (CVs)	25	
Technical approach, methodology, mission design, and innovation	25	
Quality of digital platform proposal and data management plan	15	
Work plan, risk management, and capacity-building approach	10	
Local presence and demonstrated experience in Rwanda or comparable settings	5	

Evaluation Criterion	Maximum Score	Weight
<b>Financial Proposal (lowest compliant offer receives full score)</b>	<b>100</b>	<b>30%</b>

Only proposals that achieve a minimum of seventy (70) points on the technical evaluation shall be considered for financial evaluation. The financial proposals weight will be 20% and the contract shall be awarded to the responsive proposal achieving the highest combined technical and financial score.

## 11. Submission Requirements

Applicants shall submit a complete proposal comprising two clearly separated parts:

### 11.1 Technical Proposal

- Cover letter signed by an authorized representative.
- Company profile, statement of compliance with eligibility requirements, company RDB registration certificate with the list of shareholders; Valid RRA tax clearance certificate; Valid RSSB clearance certificate; Latest tax declaration; and Proof of using EBM;
- Detailed technical approach and methodology, including mission planning, sensor specifications, processing workflows, and quality assurance.
- Description of the proposed digital platform, hosting arrangements, data security, and interoperability features.
- Implementation work plan and Gantt chart aligned with the deliverables in Section 6.
- Organogram and CVs of all proposed team members (signed and dated).
- Evidence of RCAA UOC and other regulatory authorizations.
- List of at least two (2) similar past projects with references and contactable client details.
- Risk register and mitigation plan.
- Statement on data ownership, confidentiality, and ethical compliance.

### 11.2 Financial Proposal

- Detailed budget in RWF with clear unit costs, quantities, and totals.
- Breakdown by deliverable and by cost category (personnel, equipment, operations, processing, platform, training, taxes).
- Validity of the financial offer of not less than ninety (90) days from the submission deadline.
- Statement on applicable taxes and any assumptions or exclusions.

## 12. Submission Instructions

Proposals shall be submitted electronically in PDF format to the e-mail address indicated below not later than **June 28, 2026 before 05:00PM local time**, with the subject line:

***“RFP – Drone-Based Vector Monitoring in Marshlands – [Applicant Name]”***.

Technical and financial proposals shall be uploaded as separate, clearly labelled PDF files. Late submissions shall not be considered. Submissions received after the deadline shall be automatically disqualified.

**Submission e-mail:** [rwandaprocurement@clintonhealthaccess.org](mailto:rwandaprocurement@clintonhealthaccess.org)

**Queries:** Clarification questions may be submitted in writing up to seven (7) calendar days before the submission deadline. Responses shall be circulated to all known applicants without disclosing the identity of the requester.

### 13. Payment Schedule

Payments shall be made in tranches against satisfactory delivery and written acceptance of the corresponding milestones, as indicatively summarized below. The final schedule shall be agreed upon contract signature.

Tranche	Milestone	Indicative %
1	Acceptance and approval of inception report and mobilization (D1–D2)	20%
2	Completion of first survey round and processed outputs (D3–D4)	30%
3	Deployment of digital platform and second survey round (D5–D6)	30%
4	Capacity building, final report, handover, and platform administration (D7)	20%

### 14. Data Ownership, Confidentiality, and Ethics

- All raw imagery, processed datasets, source files, derived analyses, and platform administrative rights shall be the sole property of the Rwanda Biomedical Centre (RBC).
- The service provider shall not disclose, publish, or reuse any data, imagery, or report arising from this assignment without the prior written consent of RBC and CHAI.
- All operations involving persons, communities, or sensitive sites shall comply with national and international ethical, privacy, and data-protection standards, including Rwanda's Law on the Protection of Personal Data and Privacy.
- Any incidental collection of personally identifiable information shall be promptly disclosed and managed in accordance with the agreed data-management plan.

## 15. Conflict of Interest, Fraud, and Corruption

Applicants shall disclose any actual or potential conflict of interest and shall comply with CHAI's and RBC's policies on fraud, corruption, sexual exploitation and abuse, child safeguarding, and anti-terrorism financing. Any breach may result in disqualification, contract termination, and referral to relevant authorities.

## 16. General Provisions

- CHAI reserves the right to accept or reject any proposal, to annul the procurement process, and to reject all proposals at any time prior to contract award, without thereby incurring any liability to the affected applicant(s).
- Issuance of these Terms of Reference does not constitute an offer or a commitment by CHAI to enter into a contract.
- All costs incurred in the preparation and submission of proposals shall be borne by the applicants.

### Note:

- **Data Protection and Consent:** *In compliance with the data protection law of Rwanda and by submitting your application and CV, you explicitly consent to the collection, processing, and storage of your personal data by Clinton Health Access Initiative for the sole purpose of managing and conducting the selection process for the data collection pool for which you have applied.*
- **Conflict of Interest Declaration:** *By submitting an application, you confirm that no conflicts of interest exist between yourself and any CHAI staff involved in the selection or evaluation process, nor with any members of the leadership team at CHAI's Rwanda country office.*