CONSERVATION SOUTH AFRICA
Member of the CI Network

REQUEST FOR PROPOSALS

Title: Develop, design and refine open-source rangeland monitoring tool for Africa Rangeland Watch (ARW)
RFP No: ARW2024
Date of Issuance: 30 APRIL 2024

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1. Background

Conservation South Africa (CSA), as a local affiliate of Conservation International (CI), is committed to helping societies adopt a more sustainable approach to development, one that considers and values nature at every turn and improves human well-being through the conservation of healthy ecosystems and the goods and services they provide.

A large part of the global CI portfolio focusses on native ecosystem restoration in Africa and involves implementing restoration activities that protect, manage and restore nature in a way that places people at the center of land-use decisions. To be confident in our approach to implementation and to prove successful impact of ecosystem restoration activities at scale, the need to be systematic in the way we monitor and evaluate restorative practices is imperative.

2. Project Overview

Africa Rangeland Watch (ARW) was designed and developed by Conservation International (CI) and is aimed at monitoring rangeland impact. ARW empowers users to quantify land-use and climate impacts on rangelands over time and space, based on remotely sensed satellite imagery supplemented by ground-based rangeland monitoring. Leveraging earth observation technology for tracking conservation impact and improving planning has improved decision making and informed adaptive land-use management. We aim to further develop the web-based tool by enhancing overall user interface to ensure improved user experience and scale tool functionality to Sub-Saharan Africa. Specifications for ARW development are outlined in the Product Requirements Document (PRD).

The project design and developmental scope will focus on aspects of web development and improving the ARW code framework. The current version of the tool has several capabilities that can be refined to be more inclusive of temporal and spatial dynamics that define rangeland impact at scale. Indicators and temporal data of this nature prove to be important when evaluating not only the success or impact of restoration activities at scale, but also the potential for adaptive management across various use cases. Ideally, we want more users across the African continent to apply their use cases to the tool and inherently increase the user experience and relevancy of ARW.

3. Terms of Reference, Deliverables and Schedule

This RFP calls for the development of an open-source web-based tool to monitor rangeland impact. Detailed guidelines for developmental scope can be found in Attachment 2. There are 3 main features that development will be centered around, these are outlined below:

Feature 1: User interface, user experience and report generation

1. have a clean user-friendly interface for users to interact with, providing clear instructions on the steps needed to produce baseline, spatial and temporal analysis,
2. have improved and streamlined methods of analysis across baseline averages, temporal, spatial analysis and near-real time,
3. be capable of producing concise report analysis outputs and results dashboards, as well as a side-by-side comparative graphics across indicators,

Feature 2: Tool functionality and data integration

4. have an efficient Google Earth Engine (GEE) code to run the analysis and processing of remotely sensed data, but host the database and tool front-end on an independent cloud platform.
5. integrate relevant satellite imagery products and indicators from collaborators,
6. integrate and include user profiles to allow for ground-based data to interact with remotely sensed imagery,

Feature 3: User guidance and best practices for tool application

7. provide basic support to users via a user guidance document explaining analysis methods and best practices for application,
8. run optimally and not be slow or sluggish in the user interface or producing report outputs and comparisons.

Deliverable	Requirements	Due Date
1: Feature 1	• Feature 1 fully implemented and functional	August 30, 2024
2: Feature 2	• Feature 2 fully implemented and functional	December 30, 2024
3: Feature 3	• Feature 3 fully implemented and functional	March 30, 2025
4: Maintenance and ongoing support	• Respond to minor bug fixes on an as-needed basis	June 30, 2025

4. Submission Details

a. Deadline. Proposals must be received no later than 31st May 2024 SAST. Late submissions will not be accepted. Proposals must be submitted via email to csaprocurement@conservation.org . All proposals are to be submitted following the guidelines listed in this RFP.

b. Validity of bid. 120 days from the submission deadline

c. Clarifications or questions may be submitted to prajah@conservation.org no later than 20 May 2024 SAST The subject of the email must contain the RFP number and title of the

RFP. CSA will respond in writing to submitted clarifications by the date specified in the timeline below. Responses to questions that may be of common interest to all bidders will be posted to the CSA website and/or communicated via email.

d. Amendments. At any time prior to the deadline for submission of proposals, CSA may, for any reason, modify the RFP documents by amendment which will be posted to the CSA website and/or communicated via email.

5. Minimum Requirements

a. Previous experience in web development of interactive spatial analysis tools (portfolio of previous apps and web development is welcome).
b. Experience in working with cloud based databases such as google earth engine, PostGIS etc
c. A deep knowledge and understanding of coding and back-end web development using Javascript, Python and Google Earth Engine coding environments.
d. Knowledge and experience of hosting front-end web applications that draws on the Google Earth Engine platform and coding environment.
e. Experience with integration of web-based tools and mobile data collection applications such as Earth Ranger, Quick Capture, SMART, CyberTracker etc.

6. Proposal Documents to Include

a. Signed cover page on bidder's letterhead with the bidder's contact information.
b. Signed Representation of Transparency, Integrity, Environmental and Social Responsibility (Attachment 1)
c. Technical Proposal:
    i. Corporate Capabilities, Experience, Past Performance, and 3 client references. Please include descriptions of similar projects or assignments and at least three client references.
    ii. Qualifications of Key Personnel. Please attach CVs that demonstrate how the team proposed meets the minimum requirements listed in section 5 (Minimum Requirements).
    iii. Technical Approach, Methodology and Detailed Work Plan. The Technical Proposal should describe in detail how the bidder intends to carry out the requirements described in the Terms of Reference (Attachment 2).
d. Financial Proposal:
    i. Applicants must submit an activity-based budget in a functioning Microsoft Excel file and a brief companion narrative. Budgets should be aligned to the deliverables. Worksheets should show unit costs, total units, and level of effort for each section of the scope of work.
e. Company registration documents
f. B-BBEE Certificate/ affidavit
g. Valid Tax Clearance Certificate

7. Evaluation Criteria In evaluating proposals, CSA will seek the best value for money considering the merits of the technical and costs proposals. Proposals will be evaluated using the following criteria:

Proposals will be evaluated ONLY against the Evaluation Criteria in the RFP (no other evaluation criteria may be considered for selection).

Evaluation Criteria	**Score (out of 100)**
Is the proposed approach and methodology appropriate to the assignment and practical in the prevailing project circumstances?	40%/ Max points
Is the presentation clear and is the sequence of activities and the planning logical, realistic and promise efficient implementation to the project?	15%/ Max points
Does the bidder's past performance demonstrate recent proven experience doing similar work?	10%/ Max points
Does the bidder and the proposed personnel have the specific technical expertise for the assignment?	10%/ Max points
Cost: Costs proposed are reasonable and realistic, reflect a solid understanding of the assignment.	15%/ Max points
Compliance documents ; B-BBEE Certifcate/affidavit and Tax Clearance provided?	10

8. Proposal Timeline

RFP Issued	30 April 2024
Clarifications submitted to CSA	20 May 2024
Clarifications provided to known bidders	25 May 2024
Complete proposals due to CSA	31 May 2024
Final selection	15 June 2024

9. **Resulting Award** CSA anticipates entering into an agreement with the selected bidder by **15 June 2024**. Any resulting agreement will be subject to the terms and conditions of CSA's Services Agreement. A model form of agreement can be provided upon request.

   This RFP does not obligate CSA to execute a contract, nor does it commit CSA to pay any costs incurred in the preparation or submission of the proposals. Furthermore, CSA reserves the right to reject any and all offers, if such action is considered to be in the best interest of CSA. CSA will, in its sole discretion, select the winning proposal and is not obligated to share individual evaluation results.

10. **Confidentiality** All proprietary information provided by the bidder shall be treated as confidential and will not be shared with potential or actual applicants during the solicitation process. This includes but is not limited to price quotations, cost proposals and technical proposals. CSA may, but is not obliged to, post procurement awards on its public website after

the solicitation process has concluded, and the contract has been awarded. CSA's evaluation results are confidential and applicant scoring will not be shared among bidders.

11. **Code of Ethics** All Offerors are expected to exercise the highest standards of conduct in preparing, submitting and if selected, eventually carrying out the specified work in accordance with CI's Code of Ethics. Conservation International's reputation derives from our commitment to our values: Integrity, Respect, Courage, Optimism, Passion and Teamwork. CI's Code of Ethics (the "Code") provides guidance to CI employees, service providers, experts, interns, and volunteers in living CI's core values, and outlines minimum standards for ethical conduct which all parties must adhere to. Any violation of the Code of Ethics, as well as concerns regarding the integrity of the procurement process and documents should be reported to CI via its Ethics Hotline at www.ci.ethicspoint.com.

12. **Attachments**:

Attachment 1: Representation of Transparency, Integrity, Environmental and Social Responsibility
Attachment 2: Terms of Reference

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RFP N**o. ARW2024**

All Offerors are expected to exercise the highest standards of conduct in preparing, submitting and if selected, eventually carrying out the specified work in accordance with CI's Code of Ethics. CI's Code of Ethics provides guidance to CI employees, service providers, experts, interns, and volunteers in living CI's core values, and outlines minimum standards for ethical conduct which all parties must adhere to. Any violations of the Code of Ethics should be reported to CI via its Ethics Hotline at www.ci.ethicspoint.com.

CI relies on the personal integrity, good judgment and common sense of all third parties acting on behalf, or providing services to the organization, to deal with issues not expressly addressed by the Code or as noted below.

I. With respect to CI's Code of Ethics, we certify:

a. We understand and accept that CI, its contractual partners, grantees and other parties with whom we work are expected to commit to the highest standards of Transparency, Fairness, and Integrity in procurement.

II. With respect to social and environmental standards, we certify:

a. We are committed to high standards of ethics and integrity and compliance with all applicable laws across our operations, including prohibition of actions that facilitate trafficking in persons, child labor, forced labor, sexual abuse, exploitation or harassment. We respect internationally proclaimed human rights and take no action that contributes to the infringement of human rights. We protect those who are most vulnerable to

infringements of their rights and the ecosystems that sustain them.

b. We fully respect and enforce the environmental and social standards recognized by the international community, including the fundamental conventions of International Labour Organization (ILO) and international conventions for the protection of the environment, in line with the laws and regulations applicable to the country where the contract is to be performed.

III. With respect to our eligibility and professional conduct, we certify:

a. We are not and none of our affiliates [members, employees, contractors, subcontractors, and consultants] are in a state of bankruptcy, liquidation, legal settlement, termination of activity, or guilty of grave professional misconduct as determined by a regulatory body responsible for licensing and/or regulating the offeror's business

b. We have not and will not engage in criminal or fraudulent acts. By a final judgment, we were not convicted in the last five years for offenses such as fraud or corruption, money laundering or professional misconduct.

c. We are/were not involved in writing or recommending the terms of reference for this solicitation document.

d. We have not engaged in any collusion or price fixing with other offerors.

e. We have not made promises, offers, or grants, directly or indirectly to any CI employees involved in this procurement, or to any government official in relation to the contract to be performed, with the intention of unduly influencing a decision or receiving an improper advantage.

f. We have taken no action nor will we take any action to limit or restrict access of other companies, organizations or individuals to participate in the competitive bidding process launched by CI.

g. We have fulfilled our obligations relating to the payment of social security contributions or taxes in accordance with the legal provisions of the country where the contract is to be performed.

h. We have not provided, and will take all reasonable steps to ensure that we do not and will not knowingly provide, material support or resources to any individual or entity that commits, attempts to commit, advocates, facilitates, or participates in terrorist acts, or has committed, attempted to commit, facilitate, or participated in terrorist acts, and we are compliant with all applicable Counter-Terrorist Financing and Anti-Money Laundering laws (including USA Patriot Act and U.S. Executive Order 13224).

i. We certify that neither we nor our directors, officers, key employees or beneficial owners are included in any list of financial or economic sanctions, debarment or suspension adopted by the United States, United Nations, the European Union, the World Bank, or General Services Administration's List of Parties Excluded from Federal Procurement or Non-procurement programs in accordance with E.O.s 12549 and 12689, "Debarment and Suspension".

Name: _____

Signature: _____

Title: _____

Date: _____

Attachment 2: Terms of Reference - Africa Rangeland Watch (ARW)

1. Purpose

Africa Rangeland Watch (ARW), a web-based monitoring tool will support communities, decision makers, land managers and other interested stakeholders in tracking, planning and monitoring rangeland health and condition at scale. The platform empowers users to quantify land-use and climate impacts on rangelands over time, based on earth observation satellite imagery supplemented by ground-based rangeland monitoring. Deploying satellite data via a web application stimulates interaction when paired with real time field data, creating an evidence-based system for rangeland management. This detailed and consistent insight can be used to inform adaptive management of rangelands at scale.

In its current form, ARW is powered by Google Earth Engine (GEE) and runs as a Google Earth Engine Application. Drawing from the vast satellite image and public data repository of GEE via the code editor (Python, JavaScript) functionality, ARW has been developed to a point where it is ready to be developed to scale. There are three main methods of analysis that ARW is built to perform. The first is extracting baseline averages for each rangeland management unit (e.g. farm camp, grazing polygon, etc.). The second method is comparing a single management unit with itself over time. The final method is to compare a management unit with another spatial reference unit (e.g. rested polygon or farm camp). No analysis method is viewed to be superior, and the utility of each method depends on the specific rangeland restoration use case.

Version 1 of the platform and User Interface (UI) has been developed in-house at Conservation International (CI), and has been piloted in the South African context to monitor and track rangeland health and condition. The next step in the development of ARW requires both advanced web development (mainly geared toward improving UI and user experience (UX) as well as a deep technical understanding of the GEE coding environment that drives the functionality and presents challenges to the scaling of ARW.

2. Who is it for…

The Africa Rangeland Watch (ARW) web-based monitoring platform and its outputs serve various users and stakeholders as listed below:

• Conservation International team members - CI and CI Africa Field Division (AfFD) and Conservation South Africa

• Land use planners - Teams, community members, and organizations that allocate the use of available land in the areas of interest.

• Community leadership - Community members such as chiefs and other decision-makers.

• Carbon offset and other investors - non-government, governmental, and non-profit organization that invest in the area of interest, particularly for carbon offsetting and climate.

• Policymakers - relevant local, provincial, and national government.

• Companies and businesses - building transparency and accountability for sustainable production.

• Conservationists - persons, groups, or organizations who act for the protection and preservation of the environment and wildlife.

• Financial planners - funding bodies such as non-government, Governmental, and non-profit organizations that plan the allocation of funds in Sub-Saharan Africa

3. *Why build it…*

The use cases for a web-based monitoring tool such as ARW are vast and tend to be context specific in the conservation and land-use management sector. The need to monitor, plan and track the impact of rangeland restoration interventions both at scale and over time is the primary niche ARW is intended to occupy. Further to this niche, there is an increasing need for continental monitoring and evaluation indicators relating to rangeland health and condition. It is within this context that ARW is envisioned to be further developed and serve as a continental CI monitoring tool for the rangeland restoration program across the Africa Field Division.

The current version of the application has several capabilities that can be further refined to be more inclusive of temporal and spatial dynamics that define restoration projects at scale. Functionalities such as baseline and near real time imagery analysis for indicator development and tracking have the potential to be refined and applied at scale.

Indicators and temporal data of this nature prove to be important when evaluating not only the success or impact of restoration activities at scale, but also the potential for adaptive management across various use cases. The potential to increase robustness of temporal and spatial analysis has been identified as one of the primary pathways to scaling ARW. This would allow more users across the African continent to apply their use cases to the platform and will inherently increase the user experience and relevancy of ARW.
The lack of flexibility to style widgets and UI due to limitations in the GEE library is one example of an area for development. At the moment, ARW is a stateless app (as opposed to a stateful app like Global Forest Watch) which means that there is no user context stored in the app (ie. No user login details, or user profile with metadata about the user).

The absence of automatic routines for updating the master database and allowing for users to upload or download data is further limitation of the tool. The limited integration of field data into the machine learning workflows that produce some of the layers in the map creates room for inaccuracies in context specific use-cases. An automated process where field data is uploaded and then used in the Machine Learning models to improve the maps would serve to increase impact accuracy and confidence in rangeland indicators of change. Many new global or African datasets have not yet been incorporated into the tool, this is a function that requires refinement as there are numerous datasets that are relevant to use-cases of ARW.

Design and developmental scope

Web development

The ARW user interface developed and published as a GEE application provides various functionality to users in its current form. The need to further develop the UI and improve user experience is linked to visualizing and presenting the technical development requirements as to why we need to build this tool. Further development of the current UI would serve to streamline the analysis framework and increase

platform functionality, making it more intuitive when performing baseline, near-real time, spatial and temporal analysis.

User Interface and experience

Features such as toggle buttons, time sliders, menu options and user instructions while performing analysis, need to be improved to incorporate the increased technical development. The ability to have a user login and database where the user can upload and download user-specific data within the app. ARW has none of this functionality, including this function allows users to upload and download user-specific data within the tool. The requirement for meaningful and concise report outputs from analysis done on the platform is a further motive as to why the platform should be built out to scale. Visualization of outputs such as graphics and indicators generated from ARW require improvement in terms of general aesthetics for ease of user experience and understanding.

Platform hosting and cloud-based computing

The need to host front-end of ARW on an independent cloud platform (Google Cloud Services or Amazon Web Services, etc) will form a significant part of the web development goal. GEE should still be used to do the analysis and processing of the data and used as an API which the tool interacts with (sends requests to process data and fetches the processed results). Depending on the nature of the analyses, steps can be pre-processed and stored to reduce computation needs for analysis.

This will ensure scalability of analysis capabilities of ARW as current computing limitations of earth engine prove to be a major challenge. The integration of earth observation products and indicators from beyond the ARW environment is an area that is essential for development. Initiatives such as the European Space Agency (ESA) RAMONA project produces valuable, consistent and ready-to-interpret rangeland indicators that will enhance the analytical capabilities of ARW.

Results reporting and embedded dashboard.

Development and refinement of report outputs and results from the tool is required. An output report that can neatly and accurately assemble and compile indicator data and relevant information from spatial, temporal and baseline analysis. Elements such as infographics, summary tables, graphs and other useful figures that visualize and communicate analysis results will ensure the power of the tool is realized for consistent monitoring and evaluation. Basic rangeland report templates have been developed, refinement is required on report outlay and general aesthetic and design.

Comprehensive diagnostics for proposed embedded dashboard is required, working with the CI technical team to refine dashboard look, colour scheme and indicators to include. A dashboard embedded within the tool that visualizes these elements and allows users to export or download rangeland analysis reports for project reporting, monitoring, and evaluation.

4. Back-end development of ARW - Methods of analysis and integration of data

The source code for ARW was developed in the Google Earth Engine environment (Python, JavaScript) and calls on the code editor platform to run the Earh Engine application. The source code has been annotated in detail explaining the functionality and processing steps it calls on to produce temporal and spatial

indicators. The code requires integration with ground based mobile data collection applications and will form a significant part of feature 2 deliverable and release criteria. Integration of field data serves to act as validation data for remotely sensed indicators trends over time, so as to build confidence

Baseline Averages

The baseline average function allows users to produce mean values of certain ARW indicators over a selected temporal period. The baseline function is primarily used to understand rangeland condition and health pre-implementation of restoration activities. Baselines averages provide users with a starting point for rangeland monitoring and are used to gauge impact of implementation activities by comparing indicator values to baseline averages. In its current form, baselines calculated by averaging indicator values between 2015 – 2020. Although this proves useful for projects that started implementing in 2021, it proves to be more challenging for projects that start closer to present day. Hence, it is critical that ARW can account for temporal variability when calculating baseline averages for implementation sites by enabling users to define the temporal period that calculates baselines averages.

Temporal Analysis - Comparing a single management unit with itself over time.

The temporal analysis function allows users to compare indicators across an implementation unit over time. This function aims at monitoring and tracking indicators of a single implementation site to analyze temporal dynamics. In its current state, the temporal analysis function allows for quarterly comparisons of certain indicators. Temporal resolution of this functionality requires further development as ARW needs to be more flexible and accommodating of user defined temporal periods for analysis. Further development priorities are needed in the terms of temporal analysis, predominantly focused on applicability and scalability of the current analyzer. Refinement and iteration to produce more regular monthly/quarterly/annual readings based on user input.

The integration of a temporal alert system built into ARW that uses selected datasets to trigger alerts and inform users of change. Users can get an email alert when these datasets detect a temporal anomaly (ie. disturbance) within their grazing camps. This could be fire / flooding / land cover conversion / grazing etc. and will be useful for adaptive rangeland management.

Spatial Analysis - Compare a management unit with another spatial reference unit

The spatial analysis function allows users to compare an active implementation site with surrounding areas to determine spatial differences in restoration areas as opposed to control areas. A spatial analysis calculates the relative % difference across specific indicators between your reference area and selected camp/s. Development priorities for this function include refinement of the temporal period used for comparison of sites, improving the algorithm that calculates % difference of indicators and ensuring multiple comparisons between restoration sites is possible.

Improving ARW spatial analysis functionality to calculate the impact of an intervention using a before-after-control-impact (BACI) experimental design is a key piece of development. For example, if the user chooses a response variable (eg. Fractional grass cover), then they select their control (ie. a reference site) and treatment (ie. restoration site) as well as the date of their restoration intervention. The app then uses the satellite data before and after the intervention to calculate a BACI score for the given restoration site. This

would incorporate a combination of temporal and spatial analysis and return more accurate and context specific results.

Near-real time (average for the last 30-days)

The near-real time function allows for a quick snapshot of current conditions across an implementation site and its surrounding areas. There are only 3 indicators available for near-real time analysis (NDVI, EVI and Bare Ground Cover). To be more conclusive, comparative and account for impact, near-real time analysis must be available for all indicators that are represented in the baseline averages function. The ability to query and download near-real time indicators is also required to ensure practical application of ARW across continental restoration sites.

Integration of satellite imagery products and indicators from collaborators

Africa Rangeland Watch was developed for the purpose of monitoring, planning and tracking rangeland health and condition over time. To do this accurately and consistently, ARW needs to be more inclusive of the latest remotely sensed data products by integrating existing products that have been well researched and released into the public domain. Initiatives such as the Rangeland Analysis Platform (RAP) has valuable insight into how earth observation is used to quantify environmental impact over time. The RAP development team are willing to collaborate with CI on this ARW journey and have agreed to share some of their existing earth observation products that monitor and track herbaceous biomass. Other initiatives such as Rangleland Monitoring for Africa (RAMONA), World Resource Institute (WRI) - Global Pasture Watch and NASA's Global Carbon Monitoring system have shown interest in collaboration and including relevant datasets into ARW. These datasets serve as examples, a comprehensive list of remotely sensed datasets to be included in the tool is being compiled and will be shared upon appointment.
Integration of field data

Integration of ground-based data to allow field-based personnel to both visualize real-time data while they are in the field to help them design their field campaign, but also allow them to upload their data to ARW. Ground based mobile data collection applications such as Earth Ranger (ER), CyberTracker, SMART and Quick Capture are some of the key points for integration into ARW. The integration of field data is aimed at providing ground validation for indicators and analysis trends and should be incorporated into the machine learning models to continuously improve outputs.