Request for Quotation (RFQ)
Benin CajùLab Algorithm Development

Date: February 5, 2020
Revised: February 11, 2020

Subject: Request for Quotations
TechnoServe Inc. (TNS) – Arlington, VA, invites your firm to participate in this competitive solicitation for pricing, delivery and terms for development and validation of an algorithm for measuring cashew production using remote sensing (satellite/drone) imagery and ground and other data sources. The algorithm will be developed working closely with the TechnoServe office in Benin.

Introduction
TechnoServe is an independent, non-governmental organization with 50 years of experience delivering business solutions to poverty.in 29 developing countries to help people lift themselves out of poverty by linking them not only to innovative technology, but also to information, markets, and capital. In 2019, Technoserve has been rated the first non-profit orgisation for fighting poverty by ImpactMatters.

Since June 2019, TechnoServe through its Benin office (TechnoServe Benin) is implementing the project "Drone-assisted Land Mapping for Climate Smart Cashew Production"(CajùLab) to support the upscaling and adoption of Climate Smart Agriculture best practices in Benin using digital solutions. This two-year project has been funded by Wehubit, a program of the Belgian Development Cooperation on the one hand and by the US Department of Agriculture (USDA) through the program BeninCajù on the other hand.

BACKGROUND
TNS-Benin is in the process of gathering data from various sources, including satellite imagery, drone imagery, historical aerial data from the IGN (National Geographic Institute) in Benin, weather data, geographic data (shapefile and geo-coordinates) and ground yield data.

The CajùLab program of TNS-Benin desires to generate an algorithm that can be used with satellite data to identify cashew plantations, provide counts of cashew trees, predict cashew yields, and identify farmers' practices on cashew plantations. This data will be used to provide more accurate cashew production figures to help guide government investment, to determine and mitigate deforestation from cashew farming as well as climate change effects, and to help target field training programs for cashew farmers.

GENERAL REQUIREMENTS
Quotes should be submitted no later than Friday, February 18 at 5pm US EST, and must be valid through Friday, March 6.

PRICE SCHEDULE
This is a fixed price bid, and must include all taxes and fees, in US Dollars, based on the deliverables described in Appendix A.

CRITERIA FOR SELECTION

The evaluation of each response to this RFQ will be based on vendor demonstrated competence, compliance, format, and organization. The purpose of this RFQ is to identify academic or other institutions that have the interest, capability and experience to work with TNS to develop the algorithm for identifying and measuring cashew production in Benin.

Selection will be based on price, vendor capability, vendor experience, and ability to meet our desired final deliverable date.

See Appendix A for details on expected deliverables. All quotes will be evaluated and scored based on the following criteria:

1. **Price – 40%**
   What is the fixed price estimated by vendor for work requested in the SOW?
2. **Vendor Experience – 30%**
   Does vendor have prior experience developing similar algorithms using a combination of remote sensing (satellite/drone) data and ground data, specifically for tree crops?
3. **Workplan – 30%**
   Has vendor presented a workplan with specific assigned resources that can reasonably be expected to achieve the objectives of the SOW within the requested timeframe?

TERMS AND CONDITIONS

1. The Request for Quotes is not and shall not be considered an offer by TechnoServe.
2. All responses must be received on or before the date and time indicated on the RFQ. All late responses will be rejected.
3. All unresponsive quotes will be rejected.
4. All quotes will be considered binding offers. Prices quoted must be valid for entire period provided by respondent.
5. All procurement will be subject to TNS contractual terms and conditions and contingent on the availability of donor funding.
6. TNS reserves the right to accept or reject any quotation or cancel the procurement process at any time, without assigning any reason, and shall have no liability to any vendors submitting RFQs for such rejection or cancellation of the procurement.
7. TNS reserves the right to accept all or part of the quotation when awarding the purchase order/contract.
8. All information provided by TNS in this RFQ is offered in good faith. Individual items are subject to change at any time and all bidders will be provided with notification of any changes. TNS is not responsible or liable for any use of the information submitted by bidders or for any claims asserted therefrom.
9. TNS reserves the right to require any bidder to enter into a non-disclosure agreement.
10. The bidders are solely obligated to pay for all costs, of any kind whatsoever, which may be incurred by bidder or any third parties, in connection with the Response. All Responses and supporting documentation shall become the property of TNS, subject to claims of confidentiality

in respect of the Response and supporting documentation, which have been clearly marked confidential by the bidder.

FORM/CONTENT OF RESPONSE

All quotations shall:

1. Be in the English language.
2. Contain detailed cost in US Dollars, with applicable Tax/Charges clearly identified, and provided as a fixed-price bid for the services described in the attached SOW.
3. Provide requested payment terms and conditions.
4. Describe the qualifications, experience and capabilities of the firm in providing the type of services being request by this RFQ.
5. Provide at least 3 references for similar projects *for tree crops* with a description of the work done and the dates performed.
6. Include a contact name, email address, and telephone number to facilitate communication between TNS and the vendor.
7. A brief outline of the company and services offered, including:
   - Full legal name, jurisdiction of incorporation, and address of the company
   - Full legal name and country of citizenry of company's President and / or Chief Executive Officer and / or all other officers and senior managers of the company
   - Year business was established

SCHEDULE OF EVENTS

1. Questions regarding this request may be addressed to Nadia Mabaya, *nmabaya@tns.org*, and David Hale, *dhale@tns.org*, and must be received no later than Wednesday, February 12, 2020. Responses to questions will be distributed to all interested parties no later than Friday, February 14, 2020.
2. Responses to the RFQ should be addressed to the attention of Nadia Mabaya, *nmabaya@tns.org*, and David Hale, *dhale@tns.org*, **no later than February 18, 2020**.

Appendix A: Benin CajùLab Algorithm Development

Project Start Date: March 1, 2020

Project End Date: July 31, 2020

Phase	TechnoServe Responsibilities	Vendor Responsibilities
Preparation	• Discussion of inputs needed • Discussion of satellite imagery acquisition • Test of satellite imagery base map sample • Elaboration of SOW, if needed	

Algorithm and Model Development	• Send data to vendor
	  • Lat/long data of cashew farms
	  • Polygon coordinates of cashew farms
	  • UAV high resolution (10 cm) imagery and orthomosaic of cashew farms and other trees similar to cashew trees such as mango trees
	  • Geometrically rectified high resolution (50 cm) satellite imagery of targeted areas of the project. TechnoServe will visually check that data is geometrically aligned by applying the polygon data to satellite imagery and checking for alignment.
	  • Survey data from targeted areas, including implementation of cashew best practices:
	  • Pruning
	  • Fertilization, including quantity of fertilizer used
	  • Mulching
	  • Any other practices that could affect yield
	  • 2015 plane aerial data from the IGN (National Geographic Institute) in Benin
	  • Any other data needed to develop the model and the algorithm
	• Validate initial and updated algorithm and provide feedback
		• Generate NDVI for the targeted cashew areas of the project
		• Assist in satellite imagery acquisition (as needed)
		• Develop initial algorithm
		• Test and upgrade algorithm based on TechnoServe feedback
		• Validate updated algorithm
		• Generate algorithm results for the project targeted area

Training		• Train TNS-Benin team on algorithm use and management
Final Project Report	• Contribute to scientific paper writing and publication	• Provide report on the algorithm development activity including (methodology used, brief description of the results, difficulties and recommendations for algorithm development and used in cashew sector) • Contribute to scientific paper writing and publication

Project Deliverables

1. **Algorithm Development.**
   Algorithm shall be based on remote sensing, ground and weather data captured above, to automate:
   - Identification of cashew plantations in any given orthomosaic
   - At the farm/plantation level:
     - number of cashew trees on any given plantation, based on the training sample
       - Target accuracy shall be <15% at the farm level
       - Target accuracy shall be <10% at the region level
     - identification of agricultural practices used
     - predicted yield at the farm level
   - Identification of any cashew trees from 2015
   - Estimate of forest encroachment caused by cashew farming, by comparing data on cashew farms from 2020 with data from 2015.

   If possible, algorithm shall explore the correlation between productivity and soil quality, possibly using external study inputs, e.g. AfSoilGrids250m

2. **Publication of scientific paper on cashew tree identification using remote sensing and ground data.**
   Any paper, publication, and presentation of results at conferences would be done jointly between TechnoServe and vendor.

END OF RFQ