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Government of the People's Republic of Bangladesh
Agro-Meteorological Information Systems Development Project
Component C of Bangladesh Weather and Climate Services Regional Project
Department of Agricultural Extension
Khamarbari, Farmgate, Dhaka-1215

Revised Request For Expressions of Interest
(Consulting Services – Firm Selection)

Automation in preparation of Agromet Advisory on “Agro-Meteorological Information Systems Development Project” (Component C of Bangladesh Weather and Climate Services Regional Project)
(Contract Package No: AMISDP-SD-014)

Memo: 12.01.0000.018.01.001.21. 6374

Date: 19.12.2021

The People's Republic of Bangladesh has received a credit in the amount of USD 113million as from the International Development Association (IDA) towards the cost of Agro-Meteorological Information Systems Development Project [Component –C of Bangladesh Weather and Climate Services Regional Project (BWCSR)] to be implemented by Department of Agricultural Extension (DAE) and it intends to apply part of the proceeds to payments for the provision of consultancy services for the project by hiring of an International Agro-Meteorological Services Consultant.

2. Scope of Task /Service:

The services, among others, include the following:

The proposed Decision Support System (DSS) should be unique. It should automate the process of generation of weather based, crop specific advisories which should be customized and localized to macro and micro agro-climates. Multiple data streams should be processed in a web platform and combined with scientific information related to crop growth, development and response to varying weather & climatic conditions to determine the possible agri-management practices such as crop irrigation management, nutrient requirements, pest and disease occurrence & management etc. The DSS should automate the process of generating dynamic (parameter driven), weather and-locale specific agrometeorological advisories which should be generated in both regional (Bangali) as well as in English language.

The proposed DSS should be having four major structural components:

- The graphical interface facilitates user to configure selected crop(s) to the desired location, provide/edit input data, access the locale specific dynamic weather database and run the logical inference engine to get best suitable advisories in the given situation which are displayed in a user-friendly manner.
- The dynamic weather database stores the location specific daily observed weather and weather forecasts received from Bangladesh Meteorological Department (BMD).
- Build data base on crops, soils, pests, diseases to develop logical weather forecast & climate information-based advisories.
- Building the knowledge base should be the core component of the DSS as it should store and provide data, knowledge, crop library, methods and logical rules for selection of appropriate agricultural practices to be carried out in the given crop growth stage and weather condition.
- The logical inference engine is nothing but the various computer programs written for mathematical computing and assessing logical inference rules/queries while providing best suited advisories. The inference engine through its various programs, mathematical and logical tools maneuver the knowledge base and dynamic weather database to provide practical guidance for agricultural operations.

These four structural components should be interconnected and provide as a web platform for decision support system.

3. Department of Agricultural Extension (DAE) now invites eligible consulting firms (“Consultants”) to indicate their interest in providing the Services. Interested Consultants should provide information demonstrating that they have the required qualifications and relevant experience to perform the Services. The short-listing criteria are:

- (a) General experience of the Firm(s);
- (b) Experience in similar assignments of compatible size, complexity and technical specialty in the required area;
- (c) Financial soundness of the firm and staffing and logistics of the firm.

Consultants are requested to submit the following supporting documents in support of the above-mentioned criteria:

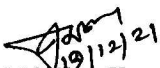
- (a) Registration paper of the firm (s); (b) JV agreement/letter of intent (if applicable); (c) Firm's brochure;
- (d) Audited financial reports for last two years; (e) service experience record (including nature, total cost, total input in terms of man month, employer, location of service etc.).

4. Consultants may associate to enhance their qualification, but should mention whether the association is in the form of a "joint-venture" or of "sub-consultancy". In the case of an association, all members of such "association" should have real and well-defined inputs to the assignment and in such "association" it is preferable to limit the total number of firms including the associates to a maximum of two (02).

5. The consultant will be selected in accordance with the Consultants Qualification Selection Method (CQS) method set out in the World Bank's Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits & Grants by World Bank Borrowers, January 2011 (Revised July 2014).

6. Terms of Reference (ToR) will be available in the office of the undersigned and also in the DAE's website (www.dae.gov.bd/site/view/tenders/tender-EOI-job-circular and <https://www.bamis.gov.bd/en/page/tender/>). Interested consultant may obtain further information from the office of the undersigned from 09:00 to 17:00 hours (Except holidays).

7. Expression of Interest (both hard and soft copy) must be delivered to the address below (in person or by mail or by email) by **16:00 hours (GMT+ 6 hours) on or before January 23, 2022**. The authority reserves the right to accept or reject any or all EOIs without assigning any reason, whatsoever.


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**Terms of Reference (ToR)
For Hiring a Consulting Firm
for**

Automation in preparation of Agromet Advisory, Package No: AMISDP-SD-014

Assignment Duration : 12 Months
Assignment location : Dhaka, Bangladesh
Funding source (s) : IDA, The World Bank
Contracting entity : Project Director, Agro-Meteorological Information Systems Development Project' (Component-C of "Bangladesh Weather and Climate Services Regional Project"), Department of Agricultural Extension, Khamarbari, Dhaka.
Method : CQS, NCB

1. Background

As part of the Agro-Meteorological Information Systems Development Project (AMISDP), Component C: Bangladesh Weather Climate and Services Regional Project, funded by the World Bank, the consulting firm will support the development of decision support system for providing locale-specific Agromet Advisories to reduce risks despite local climatic variations. Geographical and administratively, Bangladesh has 8 administrative division, 64 districts and 487 Upzillas. Given the scale, it would be difficult to manually generate timely and effective weather based, locale specific agromet advisories. Without a robust data base and decision support system in place, generating proper advisories would not be possible. The proposed DSS should help to automate crop and location- specific advisory generation, reduce drudgery and errors, minimize dependency on specialist inputs, reduce costs and create a data bank and repository of valuable information and knowledge.

Objectives

- To develop appropriate data base and Decision Support System to automate the process of Agromet advisory generation which can generate locale-specific agromet advisories at various levels (division/district/upzilla) which will help in reducing risks and improving agriculture productivity despite local climatic variations.
- To generate agromet advisory bulletin in an operational mode,
- To transfer the developed technology and impart training to DAE staff and strengthen their capacity to issue seamless agromet advisories.

2. Scope of Work

The proposed Decision Support System (DSS) should be unique. It should automate the process of generation of weather based, crop specific advisories which should be customized and localized to macro and micro agro-climates. Multiple data streams should be processed in a web platform and combined with scientific information related to crop growth, development and response to varying weather & climatic conditions to determine the possible agri-management practices such as crop irrigation management, nutrient requirements, pest and disease occurrence & management etc. The DSS should automate the process of generating dynamic (parameter driven), weather and-locale specific agrometeorological advisories which should be generated in both regional (Bangali) as well as in English language.

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These four structural components should be interconnected and provide as a web platform for decision support system.

3. Technical Approach and Methodology

The consulting firm should obtain all the related information on crop, pest and disease incidences and weather parameters from the agency. The DSS will provide holistic solutions for practical implementation considering dynamic crop and weather scenarios and will be having operational output modules as follows:

Dates of Sowing

Selection of cultivar

Integrated Nutrient Management

This module will help in deciding optimum amount of required nutrients to the crop along with appropriate time of its application. This module will not only give the precise dose of fertilizers but will emphasize sustainable practices through the suggestions on calculated amount of required organic manures, fertilizers and biological formulations.

Irrigation Advisory

Based on the daily meteorological data, the empirical equations, secondary data of the location specific soil type, advisories will be generated for effective irrigation management. Use of high-resolution soil moisture data will be explored.

Integrated Pest-Disease Management

Based on crop phenological stage and the observed and forecasted weather patterns, the most likely infestation of pest(s)/disease will be generated based on the threshold provided by the Agrometeorological experts.

Package of Practices/Cultural Practices

Scientific crop management practices with consideration of the regional practices such as crop specific land preparation, seed treatment, crop geometry, advices on trap crops, identification of pest- disease infestation etc. are suggested at appropriate time.

Dates of harvesting;

Managing storage;

Transporting farm produces;

Marketing farm produces;

Possible post processing etc

Advisories for Fisheries, Livestock and Poultry.

Weather based advisories will be generated for fisheries, livestock and poultry sector and will be included in the bulletins that could be generated.

The proposed work should be based on the firm's own state-of-the-art products and methods, and the firm should be able to demonstrate its unique expertise in the field. The firm should highlight the problems being addressed and its importance and explain the technical approach that would adopt to tackle them. The firm should also explain the methodologies that it proposes or adopts and highlight the compatibility of those methodologies with the proposed approach.

4. Deliverables and timeline

The main outcome of the project should be the development of a web application for generation of agromet advisories automatically and based on the interrelationship of weather with the different components generally used in the preparation agromet advisories. Besides, all the algorithms suited for Bangladesh region should be used to prepare the advisories.to improve the resilience of agriculture systems.

The proposed DSS should include the following modules:

- Development of advisories for land preparation sowing harvest and storage of crops
- Development of Irrigation Advisory
- Development of Pest-& Disease Advisory
- Development of judicious applications of fertilizer's & pesticides
- Development of Agromet Advisory Bulletins at district/upazila levels.
- Development of advisories for contingent planning
- Development of the above-mentioned advisories livestock, poultry and fisheries including all the major cereal, cash crops and horticultural crops

Deliverable	Date (Tentative)
Collection of crops, weather & pests & disease incidences data of cereal crops, horticultural crops, livestock and poultry	February 2022
Development of advisories for land preparation sowing, harvest and storage of crops	April 2022

Development of Irrigation Advisory	May 2022
Development of Pest-& Disease Advisory	June 2022
Development of judicious applications of fertilizer's & pesticides	July 2022
Development of advisories for contingent planning	August 2022
Development of Agromet Advisory Bulletins at district/upazila levels	October 2022
Development of advisories for Storage & transportation of farm produces	December 2022
Development of advisories for Marketing and post processing of farm produces	January 2023

Phase 1: Requirement gathering data & reports: crops, livestock, poultry scope, features specifications: irrigation, weather, Pest and disease management, Package of Practices 1 month

Phase 2: MVP 1

Testing and internal deployment– 3 districts data, 2 languages, 3 cereal crops: 2 months

Weather Advisory

Pest Management and Package of Practices – Content Management System for cereal crops

Includes static and weather param based advice configuration

Fertilization configuration

Generating weekly bulletin including Weather, Package of Practices, Pest Management and Irrigation

Phase 3: MVP 2: 2 months

Feedback on MVP 1 and revision of Advisories, bulletins, etc.

Irrigation Advice

5 more cereal crops, scale up to 10 + districts, 3+ languages, Live deployment testing and feedback

First version of Livestock & Poultry

User role access & management

Phase 4: Full Release: Scale up for advisories of cereal crops, all districts, all languages: 2 months- 4 months

Feedback and revision from Phase 3

Features enhancements, adding module for all livestock and poultry Content Management System

Product Analytics + Reports

Advisories related to storage, transportation, post processing, marketing etc.

Phase 5: Revise based on Phase 4, support, issues, minor enhancements: 8 months

5. Duration of Services and Reporting

Total Study period should be considered 12 months. The tentative reporting schedule for the consultant's assignment is given below:

Reports	Planned Time
Inception Report: 05 copies	At the end of 1st month of contract signing
First quarterly progress report: 05 copies	During 3rd month
Second quarterly progress report: 05 copies	During 6th month
Third quarterly progress report: 05 copies	During 9th month
Draft final report: 05 copies	At the end of 11 th month of contract signing
Final report: 10 copies	At the end of this study.

6. Selection Method

The consultant shall be selected following Consultants Qualification Selection Method (CQS) based selection method set forth in Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits & Grants by World Bank Borrowers, January 2011 (Revised July 2014) on the basis of consultant's qualification, experiences and capability to carry out the assignment.

7. Key and No-Key Personnel Qualifications

The firm may propose the structure and composition of its team members, listing the main disciplines of the assignment, the key experts responsible, and proposed technical and support staff. The expected team profile is presented in Table 1.

a) Key and non-key personnel with respect to Software development

Table 1: Team Profile

Designation	Number	Total Person-Months	Type
Product Lead	1	12	Continuous
Sr Software Engineer	1	12	Continuous
Jr Software Engineer	1	12	Continuous
UI/UX Designer	1	3	Intermittent
Implementation Support + Training	1	12	Intermittent
Senior Agriculture Specialist	3	30	Intermittent
Project Associate	1	12	Continuous

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b). The Qualifications of the Proposed Team

Table 2: Qualification and Experiences of Key and non-key Experts

Sl. No.	Position	Qualifications	Experience
1.	Product Lead	B.Sc /M.Sc in CSE/EEE	Having 5+ years of IT Product design and development experience, manage team of developers, recruit, coordinate with stakeholders for requirement gathering and converting into software requirement specification
2.	Sr Software Engineer	B.Sc /M.Sc in CSE/EEE	Having 4+ years of experience in latest responsive web technologies, full stack engineer, knowledge of system architecture and OOP concept
3.	Jr Software Engineer	B.Sc /M.Sc in CSE/EEE	Having 3 years of experience in responsive web technologies, high proficiency in backend tech stack, generating automated test scripts, QA
4.	UI/UX Designer	B.Sc /M.Sc in CSE/EEE	Having 3+ years of Web product development experience. Preferable degree in design, having local knowledge.
5.	Implementation Support + Training	B.Sc /M.Sc in CSE/EEE	Having 2+ years of experience of web product support. Preferably a person with background in Agriculture or related domains; documentation
6.	Senior Agriculture Specialist (National)	B.Sc. in Agriculture and M.S in Agricultural Science like Agronomy, Horticulture, Crops science, Pathology and entomology.	5 years of working experience on climate services for agriculture, including at least 3 years of working experiences on leading projects and programs
7.	Project Associate	Graduation or Master in any subject	5 years of working experience projects and programs


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