REQUEST FOR PROPOSAL (RFP)

FOR

DESIGN, DEVELOPMENT & IMPLEMENTATION OF INTEGRATED AGRICULTURE DATA HUB AND DIGITAL FARMER SERVICES PLATFORM WITH 5 YEARS OF OPERATION & MAINTENANCE

(Advt. Ref. No. NABCONS/CO-HR/018/PBCS/2023-24 dated 20.07.2023)

NABARD CONSULTANCY SERVICES (NABCONS)
24, Rajendra Place, 7th Floor, NABARD Tower, New Delhi -110125.

SECTION -1 INSTRUCTIONS TO BIDDER

1. Introduction

NABARD Consultancy Services (P) Limited (NABCONS) is a wholly owned subsidiary of National Bank for Agriculture and Rural Development (hereinafter referred to as NABARD) and is engaged in providing consultancy in all spheres of agriculture, rural development and allied areas. The Company is registered under the Company's Act, with an authorized capital of ₹2500 lakh and paid-up capital of ₹500 lakh.

The broad areas of specific competence in which the consultancy assignments are taken up by NABCONS are feasibility studies, project formulation, appraisal, financial arrangement, project management and monitoring, concurrent and impact evaluation, restructuring of Agriculture Business units, vision documentation, development administration and reforms institution development and turnaround of rural financial institutions, performance rating of rural agencies, bank supervision, policy and action research studies, seminars on rural development themes, micro finance related training, exposure visits and capacity building, training of trainers and guiding and setting up of training institutes etc.

With the increasing complexity and challenges in the agriculture sector, an advanced digital solution can greatly assist farmers, agronomists, and other stakeholders in making informed decisions and improving agricultural practices.

NABCONS Consultancy Services Private Ltd., a fully owned subsidiary of NABARD, aims to provide domain knowledge, identify and supply Sub-Consultant to establish a sufficiently capable, mature, safe, and secure database for essential crop, farmer, and land registries, as well as related applications for the Department of Agriculture of the various States by developing a Platform that aims to leverage modern technologies such as GIS, Remote sensing, artificial intelligence, machine learning, and data analytics to provide comprehensive and real-time information to users. A detailed proposal is prepared and submitted to the state Governments.

2. Objective of RFP

NABCONS is looking for offers from companies willing to partner with NABCONS on Pan India project opportunities for developing, implementing and operate Platform that aims to leverage modern technologies such as GIS, Remote sensing, artificial intelligence, machine learning, and data analytics to provide comprehensive and real-time information to users.

The qualified Bidder will act as a Sub-Consultant of NABCONS to Design, Development, Hosting, and implementation of Agriculture related Platforms.

The Bidder must submit the proposal for the Design, development & implementation of integrated agriculture data hub and digital farmer services platform for the state with 5 years of Operation and Maintenance.

NABCONS through this RFP is inviting proposals from bidders who will co-invest the Development and implementation costs as well as the Operation & Maintenance costs on a 50:50 ratio, which means the

bidder will fund 50% of its cost through its own sources, and for the remaining 50% of the cost the bidder will be remunerated as per the payment terms mentioned in this RFP under payment schedule.

The integrated agriculture data hub and digital farmer services platform aims to generate revenue from users of the platform after the Development and Implementation. Revenue generated through the services offered by the integrated agriculture data hub and digital farmer services platform to various stakeholders will be shared between the implementing State Government Department or its successor agency and the bidder in 50:50 sharing basis, after settling cumulative cost of sales from the annual revenue.

The responsibility of selling the services to farmers, various user departments, and enterprises lies with the selected Bidder, in collaboration with the implementing department of the State Government. The total cost of sale cumulative by bidder and implementing department is capped at 15% of the annual revenue generated, The settlement of cost of sales will be based on the actual costs or 15% of the annual revenue generated, whichever is lower, and will be distributed proportionally to the parties involved (Implementing Department of the state or its successor or Bidder) based on their respective incurred costs of sales

Tentative List of Prospective Users whom the Data Services could be offered:

The **INTEGRATED AGRICULTURE DATA HUB AND DIGITAL FARMER SERVICES PLATFORM** will be designed to cater to a wide range of users involved in the agriculture sector. Some of the key users of the platform may include:

Farmers: The platform provides valuable insights and recommendations to farmers regarding crop monitoring, weather forecasting, soil management, and crop selection. It assists them in making informed decisions to optimize agricultural practices and maximize yields.

Government Agencies: Agricultural departments and government agencies can leverage the platform to monitor and assess the overall agricultural landscape. It helps them in policy-making, resource allocation, and implementing effective measures to support the farming community

Agronomists: Agronomists can utilize the platform to access real-time data, analytics, and tools for crop monitoring, disease detection, and nutrient management. They can provide expert advice and recommendations to farmers based on the platform's insights.

Agribusinesses: Companies involved in the agriculture industry, such as seed suppliers, fertilizer manufacturers, and equipment providers, can utilize the platform to gain insights into market trends, crop performance, and customer needs. It enables them to tailor their products and services to meet the demands of farmers.

Researchers: The platform serves as a valuable resource for researchers involved in agricultural studies and innovations. It provides access to a wide range of data, historical records, and analytical tools that can aid in research, development, and experimentation.

Extension Services: Agricultural extension services, including advisory bodies and cooperative organizations, can use the platform to disseminate relevant information, best practices, and updates

to farmers and other stakeholders. It acts as a knowledge-sharing platform to enhance agricultural education and outreach.

These are just a few examples of the diverse user base that can benefit from the Platform. Its user-centric approach aims to empower stakeholders with data-driven insights, fostering sustainable and efficient agricultural practices.

3. Pre-bid clarifications

Bidders are required to direct all communications for any clarification related to this RFP, to NABCONS through email to headoffice@nabcons.in (latest by 3:00 PM on 26th July 2023) with the Subject" **Pre Bid Queries: Name of the Agency"** . All queries relating to the RFP, technical or otherwise, must be in writing only. NABCONS will try to reply, without any obligation in respect thereof, every reasonable query raised by the bidders. However, NABCONS will not answer any communication initiated by bidders after the completion of prescribed time. Bidders should invariably provide details of their email address(es) as responses to queries will only be provided to the bidder via email. If NABCONS in its sole and absolute discretion deems that the originator of the query will gain an advantage by a response to a question, then NABCONS reserves the right to communicate such response to all bidders.

4. Two-stage bidding process

a) For the purpose of selection of the vendor, a two-stage Quality- and Cost- Based Selection (QCBS) bidding process will be followed with 80% weightage towards Technical Bid and 20% weightage towards Commercial Bid.

b) The response to the present RFP is to be submitted in two parts, i.e. Technical Bid and Commercial Bid. These are two distinct and separate parts of the tender and shall be packed/ submitted in separate envelopes or boxes.

c) The 'Technical Bid' will contain technical details, whereas the 'Commercial Bid' will contain pricing information. The Technical Bid should NOT contain any pricing or commercial information at all.

d) Submission of the wrong type of Technical Proposal will result in the Proposal being deemed non-responsive.

e) The proposal as well as all related correspondence exchanged by the Firm(s) and the Employer shall be written in English language, unless specified otherwise.

f) In the first stage, only the 'Technical Bids' will be opened and evaluated. Those companies whose bids satisfy the technical requirements by scoring a minimum of 70 marks out of 100 in the Technical Evaluation Critera, shall be declared as the Technically Qualified Bidder. The Financial bids shall be opened only for the Technically Qualified Bidders.

g) Under the second stage, the Commercial Bids of those companies whose bids have been short-listed earlier on the basis of evaluation of their Technical Bids will only be opened for further processing.

h) Firm(s) shall express the price of their Assignment/Job in Indian Rupees.

i) NABCONS may call for further clarifications, additional particulars required, if any, on the technical/commercial bids submitted. The Bidder has to submit the clarifications/additional particulars in writing within the specified date and time. NABCONS at its discretion may disqualify the bidder's offer, if the clarifications/ additional particulars sought are not submitted within the specified date and time.

j) Amendments to this bid document may be issued at any time, prior to the deadline for the submission of bids. From the date of issue, amendments to the bid document shall be deemed to form an integral part of the bid document.

k) NABCONS reserves the right to call for an individual presentation on the features etc., from the shortlisted bidders based on the technical bids submitted by them to make an evaluation.

l) The commercial bid should contain quotation for end-to-end solution as envisaged in this document.

m) The bids must be submitted in accordance with the format specified in this document only.

n) Bidding companies must acquaint themselves fully with the conditions of the bids. No plea of insufficient information will be entertained at any time.

Kindly ensure to submit the bids in the formats as given Technical Bid (all the relevant documents, Supporting documents for evaluation) and Financial Bid in **separate** sealed covers.

5. Eligibility criteria

Sr No.	Basic Requirement	Details Requirements	Documents Required
1	Legal Entity	The bidder shall be: A Company registered in India under the Companies Act 1956 or 2013 since last 5 years, OR An LLP firm registered under The LLP Act 2008 since last 5 years, OR A partnership firm registered under Partnership Act, 1932 in India since last 5 years	• Certificate of Incorporation/ Registration • LLP firm registered certificate. • A partnership deed duly registered under the Partnership Act
2	Financial Turnover	The average annual turnover of the bidder from during from last three financial years i.e., FY 2020-21, 2021-22, and 2022-23 should be at least Rs. 30.00 Crores.	Copy of last three years audited balance sheet and profit and loss account. In case balance sheet for the financial year 2022-23 has not been finalized, provisional balance sheet. CA Certificate with CA's Registration Number/ Seal
3	Financial: Net Worth	The net worth of the bidder, as of March 31, 2023 (as per the last published audited balance sheets), should be Positive.	CA Certificate with CA's Registration Number/ Seal
4	Past Experience: Cloud based GIS Systems	The Bidder must have experience in development of Cloud based GIS application Development for agriculture or agriculture allied sectors/ Irrigation/Water/ Soil/Weather in the last 5 Financial Years with any Central Govt. /State Govt. /PSUs in India One (1) project valuing minimum INR 20 Crores OR	Work Order + Work Completion Certificates from the client. *(in case of ongoing projects each project should have completed the required revenue)*

		Two (2) projects with value of minimum INR 14 Crores each OR Three (3) projects with value of minimum INR 7 Crores *All quoted projects wherein value realized from sales of COTS/hardware shall not be considered and are to be excluded for the purpose of calculation of value of the projects.*	
5	Past Experience: AIML based systems	The bidder must have experience in development of at least one cloud-based AI and machine learning project with a contract value of Rs. 50 lakhs for any Central Govt. /State Govt. /PSUs in India	Work Order + Work Completion Certificates from the client. *(in case of ongoing projects each project should have completed the required completed turnover as required)*
6	Past Experience: Agriculture based systems	The bidder must have experience of development of cloud Web GIS System for Agriculture components which includes Geo-portal, Crop Classification, Crop Planning, Crop Health, Soil Moisture based irrigation, Weather, Advisories etc., in the last 5 Financial Years with any Central Govt. /State Govt. /PSUs in India	Work Order + Work Completion Certificates from the client.
7	Statutory Documents	The bidder must have PAN, GSTIN	Copies of PAN, GSTIN
8	Power of Attorney	The bidder must submit the power of attorney to specify an individual who will be authorized matters relevant to this RFP.	The Power of Attorney should be executed on a non-judicial stamp paper of INR. 100 (One Hundred) and duly notarized by a notary public.

8	Mandatory Undertaking	The Bidder should not have been blacklisted by any Central/State Government Organization or Department in India at the time of submission of the bid for fraudulent or corrupt practices.	Self-Declaration

Note:

A. All the scanned copies of certificates/documents attached with the tender should be stamped and signed by authorized person of the Bidder otherwise the tender is liable to be treated as INVALID. Also, all the documents on stamp papers should be invariably duly attested by Notary Public otherwise the tender is liable to be treated as INVALID. Also need to produce original certificates/documents during scrutiny stage, if asked by concerned Tendering Authority.

B. In case, Bidder has misrepresented or submitted any fraudulent information, samples, etc. regarding qualification criteria, the bid of the corresponding bidder would be rejected. EMD of that bidder shall be forfeited.

6. Technical Evaluation Criteria for QCBS

<table>
<tr><th>Sr No.</th><th>CRITERIA</th><th>Max Marks</th></tr>
<tr><td>1</td><td>The bidder shall have an annual turnover of minimum INR 30 Crores in any of the last three financial years (FY 2020-21, 2021-22, and 2022-23)
<table>
<tr><th>>= 30 Cr but <=35 Cr</th><th>>35 Cr but <=40 Cr</th><th>>40 Cr but <=50 Cr</th><th>>50Cr</th></tr>
<tr><td>4</td><td>6</td><td>8</td><td>10</td></tr>
</table>
Copy of last three years audited balance sheet and profit and loss account and CA Certificate with CA's Registration Number/ Seal to be submitted.
In case balance sheet for the financial year 2022-23 has not been finalized, provisional balance sheet may be submitted.</td><td>10</td></tr>
<tr><td>2</td><td>Certifications- CMMi Level, ISO 27001 & ISO 9001 (Marks will be given to highest available CMMI Certificate)</td><td>5</td></tr>
</table>

<table>
<tr><td></td><td>
<table>
<tr><th>ISO 9001</th><th>ISO 27001</th><th>CMMi Level 3</th><th>CMMi Level 5</th></tr>
<tr><td>1</td><td>1</td><td>3</td><td>5</td></tr>
</table>
Copy of Valid Certifications to be Submitted
</td><td></td></tr>
<tr><td>3</td><td>The Bidder must have experience in development of Cloud based GIS application for agriculture & allied/Water/Soil/Weather in the last 5 financial Years with any Central Govt. /State Govt. /PSUs in India
<table>
<tr><th>No. of Projects 1-5</th><th>No. of Projects 5 - 10</th><th>No of Projects >= than 11</th></tr>
<tr><td>1</td><td>3</td><td>5</td></tr>
</table>
Copy of Work Order + Work Completion Certificates from the client to be submitted.
</td><td>5</td></tr>
<tr><td>4</td><td>The Bidder must have experience in development of Mobile application development for agriculture & allied, Water, Soil, Weather in the last 5 Financial Years with any Central Govt. /State Govt. /PSUs in India
<table>
<tr><th>No. of Projects 1-3</th><th>No. of Projects 4 - 6</th><th>No of Projects >= than 7</th></tr>
<tr><td>1</td><td>3</td><td>5</td></tr>
</table>
Copy of Work Order + Work Completion Certificates from the client to be submitted.
</td><td>5</td></tr>
<tr><td>5</td><td>The Bidder should have experience of Satellite based Artificial Intelligence and Machine Learning in any Projects executed in last 5 financial years as per below criteria.
<table>
<tr><th>2 Projects</th><th>3 Projects</th><th>4 Projects and more</th></tr>
<tr><td>1</td><td>3</td><td>5</td></tr>
</table>
Copy of Work Order + Work Completion Certificates from the client to be submitted.
</td><td>5</td></tr>
<tr><td>6</td><td>The Bidder should have experience in extreme event warning such as Water stress, Pest Stress, Flood, Heat Wave, Drought, Cyclone etc.,
<table>
<tr><th>1Projects</th><th>2 Projects</th><th>3 Projects and more</th></tr>
</table>
</td><td>5</td></tr>
</table>

	<table><tr><td>1</td><td>3</td><td>5</td></tr></table> Copy of Work Order + Work Completion Certificates from the client to be submitted.	
7	Proposed Solution, Approach and Methodology and Work Plan	10
8	Technical Presentation	10
9	The Bidder should demonstrate any 9 (Nine) from the list of 13 use cases given below. Each use case carries 5 marks. **Live Demonstration of Use Cases on Live System:** **Platform ability (3 out of the following 5 are mandatory)** (i) Farm boundary detection using high-resolution satellite or drone data and make it available to mobile application for crop survey. (ii) Demo the Capability to Automated download of Satellite Data (optical) and (Microwave-SAR) from source repository and Automated Satellite specific corrections & pre-processing into the Platform. (iii) Demo of field level Crop Classification using multi-temporal optical and microwave satellite data. (iv) Demo the capability to Monitor crop growth temporally for a user defined field boundary. (v) No/ low code interface to plug and play or add a new data source from web services and API's The bidder should use the open-source Satellite data, downloaded foe the specific Area of Interest, asked during the presentation. The Bidder should download the imagery and the pre-processing should happen on the cloud-based platform to demonstrate the above features. **Live Systems of the past projects implemented: (6 out of the following 8 are mandatory)** (vi) Demo of State/District/city level implemented system that uses Hi-resolution Satellite data and AI-ML algorithms and Applications. (vii) GIS based Platform integrated with various Data Sources (viii) State level implemented system for having Unified Agriculture Database (ix) State level implemented system for water budget estimation.	45

	(x) State level implemented Mobile Application for data collection and information dissemination. (xi) State level implemented system for crop stress prediction and advisory. (xii) State level implemented system for pest stress prediction and advisory. (xiii) State level implemented system having crop water requirement estimation.	

The Bidder scoring a minimum of 70 marks out of 100 in the above Technical Evaluation Criteria process, shall be declared as the Technically Qualified Bidder. The Financial bids shall be opened only for the Technically Qualified Bidders

Technical Presentation and Live Demo

The bidder/ agency may be asked to make a brief presentation of their credentials and the proposed methodology/ approach, followed by live demonstration before the Evaluation Committee. The date, time & venue of the presentation will be intimated separately.

7. Timelines for bidding

The time frame for the bidding process is as under:

Events	Tentative Dates
Date of Advertisement	20th July 2023
Last date for receipt of bidders' queries	26th July 2023 by 3 PM
Last Date and Time for receipts of Proposals	10th August 2023 by 5 PM
Date of Opening of technical bids	11th August 2023
Shortlisted Bidder presentations and demonstrations	Will be informed to shortlisted Bidders
Opening of commercial bid	Will be informed to shortlisted Bidders

8. Implementation Schedule (per each State)

#	Phase	Deliverable	Timelines (T = Start of the Project)
Integrated Agriculture Data Hub and Digital Farmer Service Platform			
1. Phase -1 (Development and Final Go Live of the Modules)			
1	1.1	Inception Report	T+ 0.5 Months
	1.2	Submission of Software Requirement Specifications Document	T + 2 Months
	1.3	Creation of Unified agriculture database	T+ 3 Months
	1.4	Creation of Integrated Agriculture Data Hub and Digital Farmer Service Platform Geoportal and Mobile Application	T+ 3 Months
	1.5	Creation of AI Based field boundary detection Module	T+ 3 Months
	1.6	Creation/integration of Unified farmer database	T+ 3 Months
	1.7	Creation of Farmer and Admin user accessibility	T+ 3 Months
	1.8	Creation of Crop Classification & acreage estimation Module via remote sensing Module	T+ 4 Months
	1.9	Creation of Harvesting assessment Module via remote sensing	T+ 5 Months
	1.10	Creation of Farmer Helpdesk	T+ 6 Months
	1.11	Soil Information System	T+ 6 Months
2. Phase -2 (Development and Final Go Live of the Modules)			
2	2.1	Agro-climatic crop zone planning Module	T+ 9 Months
	2.2	Near real-time crop health monitoring Module	T+ 9 Months
	2.3	Crop yield assessment & Production cluster management Module	T+ 9 Months
	2.4	Soil Moisture based irrigation Module	T+ 7 Months
	2.5	Extreme event warning and management Module	T+7 Months
	2.6	Crop loss prediction & assessments Module	T+ 8 Months
	2.7	Farm mechanization Module	T+ 9 Months

#	Phase	Deliverable	Timelines (T = Start of the Project)
	2.8	Agro advisory services Module	T+ 8 Months
	2.9	Centralized DBT Management Module	T+ 8 Months
3. Phase -3 (Development and Final Go Live of the Modules)			
3	3.1	Farming the carbon (GHG emission, carbon sequestration, carbon credit)	T+10 Months
	3.2	Crop insurance Module	T+10 Months
	3.3	Integration with e-marketplaces	T+11 Months
	3.4	Water resource information for Irrigation potential Module	T+12 Months

Operation Stage

4	4.1	Hosting after Go-Live	T+12 Months to T+72 Months
	4.2	Operation Support	T+12 Months to T+72 Months
	4.3	Maintenance Support	T+12 Months to T+ 72 Months

9. Payment schedules

Part – A CapEx Integrated Agriculture Data Hub and Digital Farmer Service Platform

For CAPEX – All the payments during the Development and Implementation period will be based on completion of milestones, as per payment schedule in the below table. The Value of Development of Integrated Agriculture Data Hub and Digital Farmer Service Platform quoted in part A of Annexure IV- Format for Submitting Commercial Bid is defined as CapEx, the total payment to bidder will not exceed cumulative value of 50% of the CapEx. For the remaining part i.e 50% of the CAPEX value, bidder will fund through its own sources.

Sl.	Phase / Milestones of payment	Payment Percentage
1	Upon Signing of the Memorandum of Understanding	5% of Value for Development Integrated Agriculture Data Hub and Digital Farmer Service Platform (CapEx)

Sl.	Phase / Milestones of payment	Payment Percentage
2	Upon Submission of Inception report	5% of Contract Value for Development Integrated Agriculture Data Hub and Digital Farmer Service Platform (CapEx)
3	Upon Submission of Software Requirement Specifications Document	2.5 % of Value for Development Integrated Agriculture Data Hub and Digital Farmer Service Platform (CapEx)
4	Development of Krishi Hub Platform with Unified agriculture database, Geoportal and Mobile Application, Unified farmer database, Farmer and Admin user accessibility	2.5 % of Value Development Integrated Agriculture Data Hub and Digital Farmer Service Platform (CapEx)
5	Upon Development and individual Module going Live	
5.1	AI Based farm boundary detection	30% of Value for Development Integrated Agriculture Data Hub and Digital Farmer Service Platform (1.5 % for each Module upon going Live. 1.5% * 20 Modules = 30%)
5.2	Farmer database	
5.3	Farmer and Admin user accessibility	
5.4	Crop Classification & acreage estimation via remote sensing	
5.5	Harvesting assessment via remote sensing	
5.6	Farmer Helpdesk	
5.7	Soil Information Module	
5.8	Agro-climatic crop zone planning	
5.9	Near real-time crop health monitoring	
5.10	Crop yield assessment & Production cluster management	
5.11	Soil Moisture based irrigation	
5.12	Extreme event warning and management	
5.13	Crop loss prediction & assessments	
5.14	Farm mechanization	
5.15	Agro advisory services	
5.16	Centralized DBT Management	
5.17	Farming the carbon (GHG emission, carbon sequestration, carbon credit)	
5.18	Crop insurance	
5.19	Integration with e-marketplaces	

Sl.	Phase / Milestones of payment	Payment Percentage
5.20	Water resource information for Irrigation potential	
6	Security Audit of the System and Final Go-Live report	5% of Value for Development Integrated Agriculture Data Hub and Digital Farmer Service Platform

The Payment schedule mentioned above is 50% of the total value of the CapEX

Part – B OpEx (Operation and Maintenance for 5 Years)

All the payments during the Operation and Maintenance period will be based on Quarterly basis as per payment Schedule in the below table. The value of Operation and Maintenance cost quoted in Part B of Annexure IV Format for Submitting Commercial Bid is defined as OpEx. the total payment to bidder will not exceed cumulative value of 50% of the OpEx. For the remaining part i.e 50% of the OpEx value, bidder will fund through its own sources

S no.	Phase / Milestones of payment	Payment Percentage
	Annual cost of Operations, Hosting and support for 5 years after Go-Live	12.5 % of Operation and Maintenance Cost every Quarter for four Quarters of each year

Part – C - Annual Revenue Share during the Agreement period

The responsibility of selling the services to farmers, various user departments, govt departments, and enterprises lies with the selected Bidder, in collaboration with NABCONS and the implementing department of the State Government, and the cumulative cost of sale is capped at 15% of the revenue generated, or actual cost incurred, whichever is lower. and will be distributed proportionally to the parties involved (Implementing Department of the state or its successor or NABCONS or Bidder) based on their respective incurred costs of sales

Revenue generated through the services offered by the integrated agriculture data hub and digital farmer services platform to various stakeholders will be shared between the implementing State Government Department or its successor agency and the bidder in 50:50 sharing basis, after setting cumulative cost of sales from the annual revenue, on quarterly basis.

10. How to apply?

Please send your proposal with Technical and Commercial Bids in the specified formats giving complete details **in separate sealed covers**, super scribed as**'**Integrated agriculture data hub and digital farmer services platform for the state with 5 years of Operation and Maintenance"**: Technical Bid'** and **'**Integrated agriculture data hub and digital farmer services platform for the state with 5 years of Operation and Maintenance**: Commercial Bid'**, to

Chief Operating Officer
NABARD Consultancy Services Pvt. Ltd. (NABCONS), Corporate Office,
7th Floor, NABARD Tower, 24, Rajendra Place,
New Delhi - 110008.

11. Period of bid validity

The Bids shall be valid for a period of 90 days from the closing date forsubmission of the bid.

12. Consortium/JV Bidding

Not Allowed

13. Evaluation

NABCONS will evaluate the bids on QCBS (80% Technical and 20% Commercial) following the process as stated above. The evaluation criteria shallbe based on the requirements stated in this bid document.

- The employer will constitute a selection Committee to carry out the evaluation process.
- Selection Committee while evaluating the technical proposal shall have no access to the Financial Proposals until the technical evaluation is concluded, and the competent authority accepts the recommendation.
- The selection committee shall evaluate the Technical Proposal on the basis of their responsiveness to the Term of Reference and by applying the evaluation criteria specified in this RFP.
- Financial proposal of only those firm(s) who are technically qualified shall be opened on the date & time specified by employer in the presenceof the Firm(s) representatives who choose to attend.
- The cost indicated in the Financial Proposal shall be deemed as final and reflecting the total cost of services and should be stated in INR only. Omissions, if any, in costing of any item shall not entitle the Applicant tobe compensated and the liability to fulfil its obligations as per the

Termsof Reference within the total quoted price shall be that of the bidder. The bidder shall bear all taxes, duties, fees, levies and other charges other than service tax imposed under the Applicable Law as applicable on foreign and domestic inputs. The lowest Financial Proposal (Fm) will be given a financial score (Sf) of 100 points. The financial scores (Sf) of theother Financial Proposals will be determined using the following formula:

Sf = 100 x Fm/F;

in which Sf is the financial score, Fm is the lowest Financial Proposal (CapEX + OpEX cost *5 (for 5 years),and F is the Financial Proposal (in INR) under consideration.

Proposals will be finally ranked in accordance with their combined technical (St) and financial (Sf) scores:

S = St x Tw + Sf x Fw;

where S is the combined score, and **Tw and Fw** are weights assigned to Technical Proposal evaluation Criteria and Financial Proposal that will be 0.80:0.20 respectively.

***St** = Total Score of the Bidder in Technical evaluation Criteria*

***Sf** = Financial score of the Bidder*

***Tw** = Technical Proposal evaluation Criteria weight (80%)*

***Fw** = Financial Proposal evaluation criteria weight (20%)*

***Fm** = Lowest Financial Proposal received in the bidding*

***F**= Financial proposal of the Bidder under consideration*

***S**= Combined Score*

The bidder achieving the highest combined technical and financial scorewill be considered to be the successful bidder and will be issued the workorder (the Successful Bidder)

14. Responsiveness of proposals

The proposals received on time, accompanied by the requisite and proper Proposal Security shall thereafter be examined for responsiveness. A responsive proposal is one which conforms to all requirements of the Proposal Document.A proposal may be treated non-responsive for any or all of the following reasons: -

- The bidder/s not meeting all of the 'Minimum Eligibility Criteria' asstipulated in the RFP.
- All the information as indicated in the Proposal Document is not furnished.
- Validity of proposal not confirmed.
- Proposal documents not signed and sealed in the manner prescribed inthe RFP.

- The proposal and supporting documents show significant variations andor inconsistency/is.
- It the technical proposal indicates/ discloses directly or indirectly financial proposal.
- A non-responsive proposal shall be rejected at this stage.

15. Scrutiny of technical proposals

Responsive bids shall be examined in detail for their technical contents. Compliance to detailed Scope of work, Experience of bidder, proposed work plan for implementation, team composition etc. of the bidders shall be checked.

In the process of this examination, some clarifications may become necessary. These shall be sought and furnished in writing. However, the basis of proposal shall not be permitted to be changed/altered either to fulfil minimum eligibilitycriteria or to make a non-responsive proposal responsive or to qualify for meeting the technical proposal parameters. The proposals which are found deficient or defective or unacceptable due to any reason shall be treated as non-responsive.

16. Notification of Award

The acceptance of a bid, subject to contract, will be communicated in writing atthe address supplied by the bidding company/ partnership firm/ any other firmin the tender response. Any change of address of the company/ partnership firm/ any other firm should therefore be promptly notified to NABCONS.

17. Signing of Contract

The Bidder shall be required to enter a contract as per Annexure 4 with NABCONS, within 10 days of the award of the bid or within such extended period, as may be specified by NABCONS, on the basis of the Bid Document.

18. Earnest Money Deposit (EMD)

An EMD of Rs. 50,00,000.00 (Rupees Fifty Lakhs only) in the form of Demand Draft (DD) drawn in favour of NABARD Consultancy Services Pvt. Ltd., payable at New Delhi has to be submitted along with the proposal.

a) Companies registered as MSE or Startups need not pay the EMD. The certificate of Micro and Small Enterprise as defined in MSE Procurement policy issued by· Department of MSME/NSIC or Startups recognized by Department for Promotion of Industry and Internal Trade to be submitted. RELEVANT CERTIFICATES NEED TO BE SUBMITTED AS PROOFS.

b) Proposal not accompanied by EMD shall be rejected as non-responsive.

c) No interest shall be payable by the Employer for the sum deposited as EMD.

d) No bank guarantee will be accepted in lieu of the earnest money deposit.

e) The EMD of the unsuccessful bidders would be returned back.

f) The EMD of the successful bidder will be returned after the signing of the Agreement.

The EMD shall be forfeited by the Employer in the following events:

a) If proposal is withdrawn during the validity period or any extension agreed by the Firm(s) thereof.

b) If the Proposal is varied or modified in a manner not acceptable to the Employer after opening of Proposal during the validity period or any extension thereof.

c) If the Firm(s) tries to influence the evaluation process.

d) If the first ranked Firm(s) withdraws his proposal during financial negotiations (failure to arrive at consensus by both the parties shall not be construed as withdrawal of proposal by the Firm(s).

e) If any information or document furnished by the Bidder turns out to be misleading or untrue in any material respect; and

f) If the Successful Bidder fails to execute the Agreement within the stipulated time or any

19. Liquidated Damages

Liquidated Damages @ 0.5% for delay of each fortnight of the cost of the delayed work subject to a maximum of 3% of the cost of the delayed services from the mutually agreed time schedule of the completion of that component of the services after allowing a grace period of one month will be deducted from the charges payable to Sub-Consultant. These LD charges will be applicable except for the circumstances which are beyond the control of Sub-Consultant and subject to force majeure conditions not prevailing. In relation to delays where delays are not attributable to Sub-Consultant and levy of LD is not proposed, extension of time without any penalty shall be considered with the approval of the Client.

20. Right of the NABCONS to accept or reject the bid

a) NABCONS reserves the right to accept/reject any or all offers submitted in response to this without assigning any reason whatsoever.

b) NABCONS reserves the right to short-list the vendors based on the requirement of NABCONS and may call bidders for a presentation or otherwise before an evaluation committee, at bidder's cost.

21. Governing Law and Disputes

a) The bids and any contract resulting therefrom shall be governed by and construed according to the Indian Laws.

b) All disputes or differences whatsoever arising between the parties (i.e., NABCONS and the Bidder) out of or in relation to the Development, Operation and Maintenance or effect of this Bid Document or breach thereof, shall be settled amicably. If, however, the parties, as above, are not able to resolve them amicably, the same shall be settled by arbitration in accordance with the applicable Indian Laws, and the award made in pursuance thereof shall be binding on the parties, as above. The Arbitrator/Arbitrators shall give a reasoned award. Any appeal will be subject to the exclusive jurisdiction of the courts at New Delhi, India.

c) The Bidder shall continue work under the Contract during the arbitration proceedings unless otherwise directed in writing by NABCONS or unless the matter is such that the work cannot possibly be continued until the decision of the arbitrator or of the umpire, as the case may be, is obtained.

d) The venue of the arbitration shall be New Delhi, India.

22. Force Majeure

In case either party is prevented from performing any of its obligations due to any cause beyond its control, including but not limited to act of God, fire, flood, explosion, war, action or request of governmental authority, systemic breakdown, failure of electricity supply, accident and labor trouble, the time forperformance shall be extended until the operation or such cause has ceased, provided the party affected gives prompt notice to the other party of any such factors or inability to perform and resume performance as soon as such factors disappear or are circumvented. Decision of NABCONS in this regard shall be final and shall not be questioned in arbitration or other legal proceedings.

"Force Majeure" means an event which is beyond the reasonable control of a Party, is not foreseeable, is unavoidable, and makes a Party's performance of its obligations hereunder impossible or so impractical as reasonably to be considered impossible under the circumstances, and subject to those requirements, includes, but is not limited to, war, riots, civil disorder, earthquake, fire, explosion, storm, flood or other adverse weather conditions, strikes, lockouts or other industrial action confiscation or any other action by Government agencies

Force Majeure shall not include (i) any event which is caused by the negligence or intentional action of a Party or such Party's Experts, Sub consultant/Vendors/Developer or agents or employees, nor (ii) any event which a diligent Party could reasonably have been expected to both take into account at the time of the conclusion of this Memorandum of Understanding, and avoid or overcome in the carrying out of its obligations here under.

Force Majeure shall not include in sufficiency of funds or failure to make any payment required hereunder.

A Party affected by an event of Force Majeure shall notify the other Party of such event as soon as possible, and in any case not later than fourteen (14) calendar days following the occurrence of such event, providing evidence of the nature and cause of such event, and shall similarly give written notice of the restoration of normal conditions as soon as possible.

23. Limitation of Liability

Notwithstanding anything to the contrary elsewhere contained in this RFP, neither Party shall, in any event, regardless of the form of claim, be liable for any indirect, special, punitive, exemplary, speculative or consequential damages, However, the foregoing shall not include any loss of data, business interruption, and loss of income or profits, irrespective of whether it had an advance notice of the possibility of any such damages.

Subject to the above and notwithstanding anything to the contrary elsewhere contained herein, the aggregate liability of bidder under the Agreement shall not exceed the amount of Professional Fees actually paid by NABCONS. Provided, that aforesaid limitation of liability shall not be applicable in respectof claims arising as a result of infringement of Intellectual Property Rights of athird party.

24. Conditions under which this RFP is issued

a) This RFP is not an offer and is issued with no commitment. NABCONS reserves the right to withdraw the RFP and change or vary any part thereof at any stage. NABCONS also reserves the right to disqualify any bidder, should it be so necessary at any stage. Information provided in this RFP to the Applicants is on a wide range of matters, some of which depends upon interpretation of law. The information given is not a complete or authoritative statement of law. The Authority accepts no responsibility for the accuracy or otherwise for any interpretation or opinion on the law expressed herein.

b) NABCONS may in its absolute discretion, but without being under any obligation to do so, update, amend or supplement the information, assessment or assumption contained in this RFP.

c) The Applicant shall bear all its cost associated with or relating to the preparation and submission of its proposal including but not limited to preparation, copying postage, delivery fees, expenses associated with any demonstration or presentations which may be required by NABCONS or any other costs incurred in connection with or relating to its proposal. All such cost and expenses will remain with the Applicant and NABCONS shall not be liable in any manner whatsoever for the same or for any other expenses incurred by an Applicant in preparation or submission of the Proposal.

d) NABCONS reserves the right to withdraw this RFP, if it is in the best interest of the organization.

e) Timing and sequence of events resulting from this RFP shall ultimately be determined by NABCONS.

f) No oral conversations or agreements with any official, agent or employee of NABCONS shall affect or modify any terms of this RFP and any alleged oral agreement or arrangement made by a bidder with any department, agency, official or employee of NABCONS shall be superseded by the definitive agreement that results from this RFP process. Oral communications by NABCONS to bidders shall not be considered binding on NABCONS, nor shall any written materials provided by any person other than NABCONS.

g) Neither the bidder nor any of the bidder's representatives shall have any claims whatsoever against NABCONS or any of their respective officials, agents, or employees arising out of, or relating to this NABCONS or these procedures (other than those arising under a definitive service agreement with the bidder in accordance with the terms thereof).

h) Applicants who are found to canvass, influence or attempt to influence in any manner the qualification or selection process, including without limitation, by offering bribes or other illegal gratification, shall be disqualified from the process at any stage.

i) Late Proposal: Any Proposal received by NABCONS after due date will not be accepted and shall be returned unopened to the Bidder.

j) For all the bids received before the last date and time of bid submission, the proposals and accompanying documentation of the qualification proposal will become the property of NABCONS and will not be returned after opening of the qualification proposal. NABCONS is not restricted in its rights to use or disclose any or all of the information contained in the proposal and can do so without compensation to the bidders. NABCONS shall not be bound by any language in the proposal indicating the confidentiality of the proposal or any other restriction on its use or disclosure.

k) By submitting a proposal, each bidder shall be deemed to acknowledge that it has carefully read all sections of this RFP, including all forms, schedules and annexure hereto, and has fully informed itself as to all existing conditions and limitations.

25. Change Requests (Scope)

Any requirements that fall outside the scope of work mentioned in the scope of work will be considered as change requests. The following activities are categorized as change requests:

- Functional changes in the application
- Development of new modules in the existing system
- Alterations to the core application framework
- Addition of extra resources to the project operation

- Any additions to the Bill of Quantities (BoQ) list
- Development of new models

The consultant should analyze the suggested changes and provide an effort estimation, including the cost and timeline for necessary approvals and implementation post approval.

SECTION- 2 SCOPE OF WORK

1. Solution Introduction

The problems with the agriculture sector, which stand in the way of realizing its full potential, directly or indirectly affect the lives of the farmers as well. While the macroeconomic factors may not be in the hands of the farmers, they can be supported with the right information. With an effort to support the farmers, NABCONS aims to establish an 'Integrated Agriculture data hub and digital farmer services Platform for Agriculture' for various states and onboard technology partners to build the platform. NABCONS has identified potential states for the implementation of the envisaged platform, these states are Assam, Bihar, Jharkhand, Kerala, Tripura, Uttarakhand and West Bengal. Through this RFP Successful Bidder will build, implement, operate and maintain for any one of these states, and submitted price will be applicable for extending to other states.

The technology empowered 'Integrated Agriculture data hub and digital farmer services Platform' is aimed at rendering valuable informational insights to farmers across the crop lifecycle to make the innumerable decisions they have to, starting from the choice of crop to sow to the right time to harvest and sell, and the most prominent of them are the following:

1. Unify all state Agri related data on a one single platform to improve farm level understanding of agriculture ecosystem.

2. Identify farm boundaries through AI and satellite data to determine individual farm characteristics and historical practices.

3. Identify the right crop to sow based on Agro climate zone planning and water availability to reduce the risk of climate change to farmers and improve farmers' income.

4. Understanding crop type and acreage sown, in-season crop advisories, crop health, and yield estimation.

5. Planning market yard linkage to ensure smooth supply chain and best service to farmers, by having visibility into weekly harvest readiness.

6. Understanding farm mechanization and human resource availability allows for better planning and ensure smooth operations even in a pandemic situation like COVID-19.

7. A comprehensive view of the farmers, land holdings and crops sown for effective implementation and monitoring of government benefits and schemes.

8. Enabling crop insurance

Every day, farms generate hundreds of thousands of data points on the ground. With the help of AI, we can now analyze a variety of things in real-time such as weather conditions,

temperature, water usage, or soil conditions collected from farms to make better decisions. Integrated Agriculture data hub and digital farmer services Platform, will help in multiple areas including the following:

1. Integrate all the data sources (GIS, MIS, Telematics etc) from various government departments and third-party systems into a single unified Big Data database and digital platform

2. Provide the ability to base decisions on Real-time data

3. Combine scientific models (Crop, Water, Weather, Risks etc.) and validated data to generate actionable advisories for farmers and extension officers

4. Provide a digital mechanism (SMS and mobile app notifications) for delivering specific and customized advisories to each of the Agriculture extension officer and farmer in the state

5. Enable farmer participation through a vernacular and easy to use mobile application

2. Scope of Work

The 'Integrated Agriculture data hub and digital farmer services Platform' should have the following features:

The platform should be created using an open-source and open standards-based framework that incorporates standardization, openness, scalability, and built-in security features for all hosted applications.

To ensure future scalability in both vertical and horizontal directions, the platform should leverage open-source technologies, eliminating any dependency on enterprise services. The platform should have the following Technological features:

- **Open-source Technologies:** The platform should utilize open-source technologies and applications (open standard, scalable and security inbuilt) to make sure that platform is scalable or maintainable in future without further license cost.

- **API Integration:** The platform should have the capacity to integrate existing platforms and data sources.

- **Unified Database:** The unified database should incorporate data from existing systems, sourced input modules, and multiple standalone systems including historical data, and other relevant information.

- **Interoperability:** The platform should be accessible through API for developing applications or portals in the future.

- **Web-GIS Capability:** The platform should have all the GIS related functionalities to perform various operations using spatial and non-spatial data in Web-browser.

- **AI/ML Capability:** Machine learning and artificial intelligence should be integral components of the platform, enabling it to analyze and comprehend generated data. The platform should provide intelligent actionable decisions and advisory services based on its learning.

- **No Code Integration with Data Sources:** The system should facilitate integration with other new data sources without additional coding or minimal coding effort. It should enable unification using either API integration, DB integration or other suitable means based on the need to ensure uniform visibility.

- **Geo-intelligent Mobile Application:** The Mobile application should be compatible with Android and iOS Platforms. The mobile application should have user friendly forms for location enabled survey, data entry and option to upload documents, pictures and other information including spatial and Non-spatial data.

- **Content And Access Management:** The platform should enable the appropriate authorities to dynamically alter or update application specific data without the constant assistance of a web developer. The platform also should have capabilities to create a new user, assign/restrict user access etc.

- **Data Security and Privacy:** The Platform should have user management for safe user access and data visibility restrictions depending on user role. The user rights and duties should be changeable, and access control will be created and implemented in accordance with the authorities' reasoning.

- **Data Processing:** The platform should have capability to process data through trigger or scheduled mode. The platform also should have the capability to manage parallel or sequential processing or queue processing.

- **Security:** The platform should prioritize strong security measures, including advanced encryption methods like SSL 3.0 and integration with active directory servers if needed. It should have built-in security for all hosted applications and databases, with centralized data storage, server security, network firewalls, and IP whitelisting.

- **Satellite Data Processing Capability:** The Platform should be able to automatically download, process and store open-source satellite data and its derived results. The platform should have the capability to integrate commercial satellite data or drone data, if required or made available, using file upload, FTP or API integration. The Platform should have the required functionality available for sensor specific pre-processing, and application specific processing based on triggered or scheduled mode.

The platform should have the following **Components** which includes, but is not limited to, the following key components:

(i) Unified agriculture database
(ii) Geoportal and Mobile Application
(iii) AI Based farm boundary detection
(iv) Unified farmer database
(v) Agro-climatic crop zone planning
(vi) Farming the carbon (GHG emission, carbon sequestration, carbon credit)
(vii) Farmer and Admin user accessibility
(viii) Agro advisory services
    (a) Field preparation and date of sowing advisories
    (b) Crop stress advisory for rainfed crops
    (c) Weather alerts
    (d) Pest alerts
    (e) Soil fertility and soil health card-based advisories
    (f) Input Management (Seeds, Fertilizers, Manures, PPC, Machineries etc)
    (g) Scheme onboarding
    (h) Loss reporting by farmer/extension officer
(ix) Crop Classification & acreage estimation via remote sensing
(x) Near real-time crop health monitoring
(xi) Crop yield assessment & Production cluster management
(xii) Soil Moisture based irrigation.
(xiii) Harvesting assessment via remote sensing
(xiv) Extreme event warning and management
    (a) Drought
    (b) Floods
(xv) Crop loss prediction & assessments
(xvi) Crop insurance
(xvii) Centralized DBT Management
(xviii) Farm mechanization
(xix) Farmer Helpdesk
(xx) Soil Information Module
(xxi) Integration with e-marketplaces
(xxii) Water resource information for Irrigation potential

All the above modules are illustrated below:

2.1. Unified Agriculture Database

The digital platform will combine spatial and non-spatial data from different data sources into one unified agriculture database. This will include real-time data from sensors, data from forecast models, data from satellites, data from hydrology and crop models, data from state and central government agencies integrated through APIs, file uploads, FTP and web portals, crowdsourced data and data generated through digitization. The data related to each of these stacks may be already available in various digital infrastructure or state agriculture information systems and other Departmental apps must be pulled using APIs. The data pertaining to other fields will be entered by the respective users based upon their authorization levels. Facility for entering profile, land, crop, asset details soil type and soil health, digital elevation model and slope shall be provided as part of registration. Data entry option to submit all his farm details along with details of interacting agencies involved in providing inputs like planting materials, machineries, equipment's, fertilizers, PPCs and credit shall be provided. Facility for registration shall also be provided to institutions involved in cultivation. Relevant financial data (Aadhar, GSTIN, Income Tax Data will be captured from them through APIs).

The following systems will be integrated: (tentative list):

- Pradhan Mantri Kisan Yojna (PMKISAN) system by National Informatic Center (NIC).
- Soil Health Card by NIC.
- Public Distribution System (PDS) by NIC.
- Aadhar card by Unified Identification Authority of India (UIDAI) System
- Various spatial data by State Data Infrastructure Systems (SDIs) Any state specific revenue management system, if any Vegetable, (physical marketing/retail outlets), e-commerce platforms, if any
- State Specific Treasury Systems
- Public Financial management System (PFMS) by NIC
- State Specific Weather and Flood forecast Warning systems and other forecasting systems, if any
- State specific Crop pest surveillance system if any (System to identify pest and diseases on crops)
- HAPIS & Hortnet portal by NIC
- and any other systems and databases at state level used in Agriculture ecosystem.

The objective of this module is to:

- Provide last mile information on state agriculture ecosystem
- Enable historical analysis of agriculture practices, produces, farmer benefits, losses and many more
- Enable farm and farmer specific modules as illustrated below.

The functional requirement of this module is provided below.

a) **Data Integration:** The system should be capable of integrating spatial and non-spatial data from various sources into one unified agriculture database. This includes real-time sensor data, forecast models, satellite data, hydrology, and crop models, data from government agencies, file uploads, FTP and web portals, crowdsourced data, and digitized data.

b) **Data Standardization**: The system should ensure data standardization to maintain consistency across different datasets. It should establish data models and mapping techniques to align data from various sources into a unified format for efficient storage, retrieval, and analysis.

c) **Data Source Connectivity:** The system should have the ability to connect to different data sources, including state and central government agencies, through APIs, file uploads, FTP, and web portals. It should establish secure connections to retrieve data from each source and ensure data integrity during the integration process.

d) **Integration with Existing Systems:** The system should integrate with various existing systems, such as the Pradhan Mantri Kisan Yojana (PMKISAN), Soil Health Card, Public Distribution System (PDS), Aadhar card, spatial data systems, revenue management systems, single-window interfaces, farmers' welfare fund boards, automation systems for agro services, marketing platforms, treasury systems, public financial management systems, weather and flood forecast warning systems, crop pest surveillance systems, and other relevant systems used in the agriculture ecosystem.

e) **Data Capture from External Systems:** The system should capture relevant financial data from external systems through APIs. It should establish secure connections with these systems to retrieve financial data of users and institutions involved in cultivation.

f) **Data Security and Privacy:** The system should prioritize data security and privacy. It should implement appropriate security measures to protect the confidentiality, integrity, and availability of the data. Access controls and encryption techniques should be in place to safeguard sensitive information.

g) **Scalability and Performance:** The system should be scalable to accommodate the growing volume of data and users. It should be able to handle data processing and retrieval efficiently, ensuring optimal performance even as the database expands.

2.2. Geoportal And Mobile Application

Geoportal

The geoportal is an interactive way to access the information of interest by interacting with a virtual map. This allows users to see macro images as well as navigate to the level of a farm.

Some of the features of geoportal are:

View agro-climatic zone plan, soil health, soil type, crop sown, crop health, pest infestation, crop stress, yield information, current weather, weather forecast, farm mechanization etc, as an interactive map.

- Visual comparison with historical data
- From state level visibility to farm level details with simple zoom function
- Allow authorities to quickly assess need of intervention, farmers to understand forecast and advisories and researchers a real-time visualization for any kind assessment
- Integration with free satellite imagery and related processing
- Point of interest information, for information it will start with personalized views for farmers, field executives, admin officials or policy makers.

This should allow authorities to quickly assess the need of intervention, farmers to understand forecasts and advisories and researchers a real time visualization for any kind of assessment. Geo-portal shall be customizable to act as a decision support tool for crop planning, farming activities and market management.

The geoportal should be using Geographic Information System (GIS), Remote Sensing (RS), and Global Positioning System (GPS) to acquire data that is referenced to earth for analysis, crop modelling, simulations, and visualizations. Geotagging, Geo fencing, GIS mapping facilities should be available in the system. Incorporation of technologies like Drone mapping and the like to facilitate crop modelling analysis and other features too should be incorporated. Also embedded sensors in croplands shall be deployed and data collected to the Cloud. Crop area and yield estimation, harvesting assessment etc. would be done using geo spatial tools like remote sensing.

The geoportal will help in:

- Spatial analysis of all agriculture related data
- Multiple layers to create custom reports via geoportal itself by using one or more layers
- Provides admin functionality to add, edit, remove users, as well as their access controls
- Enable various scientific and AI based models
- Automate remote sensing data analysis

Mobile Application

The app's objective is to make information dissemination simple and quick. The app should be linked to the Unified Farmer Database that will be developed as part of the project. The app should facilitate the modification of the information recorded in the system and track the benefits/schemes at the field level in addition to the sharing of advisories and farmer specific information.

So, the core features should be:

- Geotagged data collection
- Farmer registration

- Visualization of crops and soil nutrient
- Accessibility to existing agriculture or other Geoportals
- Farmer support portal
- Soil test facilitation
- Crop Cutting Experiments
- Crop insurance - enrolment, claims and settlements.
- Farmers should be able to obtain a detailed calendar of the package of practices to be followed from date of sowing to harvesting based on the crop registered.
- App should facilitate the dissemination of information effortlessly and with specific details of the crop the farmer is growing. This ensures that the right information is provided to the right people at the right time, and that it is personalized and specific to the farmer's situation.
- Farmers should be able to use their mobile phones to register any incident or any crop health issue as soon as they noticed it in the field. They can also take photos and videos of the Incident, Disease, Pest/, or crop health issue. These incidents are monitored with built in SLA

The mobile application should

- Enable as ground truthing system
- Enabled farmer and field official engagement
- Allow to capture geo intelligent data from field
- Fill data gaps by capturing form and picture-based data
- Help consume various analytics generated by platform

2.3. AI Based Field Boundary Detection

The AI algorithm leverages high resolution satellite imagery (open source or provided by department) of 80 cm and higher to automatically identify field polygons, which makes field boundary identification an autonomous task. Once field boundaries are identified it enables the platform to tailor all the climate, crop models and remote sensing intelligence-based advisories to individual fields.

This module should:

- Reduce time and resources required to do field digitization.
- Allow farmers to select its field directly rather than geo fencing field area which require more skills and time.
- Enable field specific analytics from satellite rather than pixel level, making the platform more useful and easier to use by both farmers and administrators.

The functional requirement of this module is provided below:

- **High-Resolution Image Utilization**: The system should be able to utilize high-resolution satellite images or drone images as input for bund boundary generation. It should support the integration of commercial high-resolution satellite images or the option to upload high-resolution images.

- **AI Algorithm Integration**: The system should integrate the latest AI algorithms for segmenting high-resolution images and generating bund boundaries.

- **Pre-Trained Model Availability**: The system should provide pre-trained AI models specifically designed for bund boundary detection. These models should be readily available for users to apply without requiring deep knowledge of AI/ML algorithms.

- **Training and Re-training of AI Models:** The system should facilitate users in training new AI models or retraining existing models using a new set of training datasets. It should provide tools and features to upload training datasets, set training parameters, and monitor the training process.

- **Task Manager**: The system should have a task manager that allows users to track and monitor the progress of bund boundary detection tasks or subtasks. Users should have the ability to cancel or resume tasks as needed, providing flexibility and control over the process.

- **Performance and Scalability**: The system should ensure efficient performance and scalability to handle large datasets and complex AI algorithms. It should be able to process high-resolution images and generate bund boundaries in a timely manner, even as the system usage grows.

- **User-Friendly Dashboard**: The system should develop a user-friendly dashboard that requires no programming experience. It should be intuitive and accessible for users with functional, geospatial, remote sensing, and AI/ML understanding. The dashboard should allow users to train models, use pre-trained models, and generate bund boundaries periodically.

2.4. Unified Farmer Database

The unified farmer's database should contain consolidated data of the farmers of the state. It should include the farmer's identity, personal information, family information, bank information, land records, season-wise crops sown data, subsidies and benefits eligible for and availed. Farmers will be identified by unique individual IDs. This database should be capable of integrating with other databases as required in order to remain dynamic and up to date. While land ownership, tenancy, and cultivation details may change over time, the Farmer IDs should remain unchanged.

The objective of the unified farmer database in the state is to enable:

- Visibility on farmers, their land holding and other related information's
- Farmer's eligibility & enrolments in State and Central schemes
- Direct benefit transfer
- Insurance visibility
- Tenant farmers and tenancy details
- Scheme availability and availed
- Allow farmers to report crop losses and other key details
- Enable farmer to raise various support request and link profiles with helpdesk

The functional requirement for this module is provided below.

a) Farmer Data Collection and Consolidation: The unified farmer database shall be prepared by collecting and consolidating data of farmers within the state. It should allow for the storage of farmer's identity, personal information, family details, bank information, land records, season-wise crops sown data, subsidies, and benefits availed. The system should ensure accurate data entry and maintain data integrity.

b) Unique Farmer IDs: The system should assign a unique individual ID to each farmer within the unified database. These IDs should remain unchanged over time, even if there are changes in land ownership, tenancy, or cultivation details. The unique IDs will serve as a primary identifier for farmers within the database.

c) Integration with Other Databases: The unified farmer database should have the capability to integrate with other relevant databases as required. It should establish connections and data synchronization with systems such as scheme databases, insurance platforms, financial systems, and other databases to ensure the database remains dynamic and up to date.

d) Data Updates and Maintenance: The system should allow for regular updates and maintenance of the farmer database. It should provide functionality for adding new farmers and archiving or removing obsolete records.

e) Data Accessibility and Security: The system should implement appropriate access controls and data security measures to protect the confidentiality and integrity of farmer data. It should ensure that authorized personnel can access and modify the data while maintaining data privacy and compliance with relevant regulations.

f) Scalability and Performance: The system should be scalable to handle a large volume of farmer data. It should be capable of processing and managing data efficiently, ensuring optimal performance even as the database grows. The system should handle concurrent user access and provide a seamless experience to users.

2.5. Agro-Climatic Crop Zone Planning

With changing weather and market demand, as well as available options for diversification, it is absolutely essential to cultivate the right basket of crops to minimize risk and maximize overall income. The ACZ module will consider agriculture, economic, social and climate change data to determine the most suitable crop combination for a specific area.

The aim of ACZ planning is:

- To help the farmers and department arrive at the optimum combination of crops suitable for the area
- To reduce the overall risk and maximize the GVA with the right crop plan
- Efficient water management, enough water can be saved in Kharif to supply water in Rabi to grow crops that have a higher market demand.

The functional requirements for this module are:

a) Agro-climatic and Agricultural Data Integration: The system should integrate crucial agro-climatic and agricultural data to provide insights into climate conditions and agricultural dynamics. It should include data on temperature, precipitation, humidity, solar radiation, growing degree days, and other relevant parameters to support agro-ecological characterization and regional planning.

b) Crop Selection Criteria and Personalized Recommendations: The system should allow users to specify criteria for personalized crop recommendations based on the specified crop criteria selection, such as climate conditions, soil type, market demand, and other relevant factors. It should provide a comprehensive crop database with detailed information on various crops.

c) Spatial Decision Support System: The system should create a Spatial Decision Support System (SDSS) that focuses on agro-climatic planning. It should establish an information bank for the agricultural reform process and efficient management of agricultural land and related activities. The SDSS should provide valuable insights and guidance to enhance productivity and sustainability.

d) Sustainable Agricultural Land Use Planning: The system should propose a sustainable agricultural land use plan by integrating multiple factors. It should consider land capability, productivity, soil suitability, terrain characteristics, and socio-economic aspects using GIS technology. The plan should promote sustainable agriculture practices that optimize resources and ensure long-term viability.

e) User-Friendly Interface: The system should have a user-friendly dashboard interface that is easy to navigate and understand. It should provide intuitive features and visualizations to help users explore agro-climatic zones, crop selection options, and land use plans.

2.6. Farming the Carbon (GHG Emission, Carbon Sequestration, Carbon Credit)

Carbon emission Dashboard

A carbon emission dashboard should be made available that will estimate, identify and display a heat map of agriculture carbon emission in the state. Crop-specific carbon emission potential data, as well as crop type maps should also be used to estimate cropland carbon emission hotspot maps.

Carbon credit potential Dashboard

Each crop in combination with different crop management practices (such as sowing method, choice of fertilizer, amount of fertilizer etc.) has a different potential to sequestrate atmospheric carbon in soil through plant photosynthesis activity. The dashboard should display the state's cropland carbon credit potential heat map. To estimate the amount of carbon that can be sequestered, crop specific carbon sequestration potential should be used.

Carbon farming monitoring DSS for Pilot region

In accordance with the state departments' vision, a pilot study should be conducted in which climate smart and carbon sequestering methodologies and practices should be adopted. This DSS should use Data entry from the field, IoT Sensors, Satellite data and scientific models to validate methods and practices and quantify carbon sequestration.

The objective of farming the carbon module is to:

- increase the economic value of the state's natural assets
- increase the resilience of the agricultural industry with improved soil health
- help economic diversification and additional income to farmers
- meet greenhouse gas reduction targets

The functional requirements for this module are:

a) Data Integration: The system should integrate relevant data sources such as field data, and crop-specific carbon sequestration potential data. It should ensure seamless data integration to provide accurate and up-to-date information for carbon farming assessment.

b) Carbon Emission Dashboard: The system should provide a user-friendly carbon emission dashboard that estimates, identifies, and displays a heat map of agriculture carbon emissions by utilizing crop type map of the state. It should utilize crop-specific carbon emission potential data and crop type maps to estimate cropland carbon emission hotspot maps.

c) Carbon Sequestration Potential Dashboard: The dashboard should display the state's cropland carbon sequestration potential heat map. It should consider different crops and crop management practices (e.g., sowing method, choice, and amount of fertilizer) to determine the potential for sequestering atmospheric carbon in the soil through plant photosynthesis activity. It should utilize crop-specific carbon sequestration potential data to estimate the amount of carbon that can be sequestered.

d) Carbon Farming Monitoring for Pilot Region: The system should design a dashboard to monitor carbon farming studies in pilot region. It should integrate data entry from the field, IoT sensors, satellite data, and scientific models to validate carbon sequestration methods and practices. The dashboard should provide analysis of carbon sequestration data from various adopted methodologies and practices.

e) User-Friendly Interface and Visualization: The dashboard should provide intuitive visualization tools such as heat maps, graphs, and charts to represent carbon emissions, carbon sequestration potential, and pilot studies data. These tools should help users understand and analyze the information effectively. The system should have a user-friendly interface that is easy to navigate and understand. It should provide clear and concise information, allowing users to access relevant data and insights without requiring extensive technical expertise.

2.7. Farmer and Admin User Accessibility

The platform should include a personalized dashboard for farmers and general public that provides information at-a-glance. The main purpose is to communicate information quickly, clearly, and efficiently. Dashboard will display trends and changes over time. The Dashboard should be customizable, with drill-down capabilities and an intuitive data presentation. Dashboard should display farmer specific farm details including land, crop, asset, allied activity and so on.

Role-based dashboard (Department): This Dashboard should be available to users at various levels of the Department and other stakeholders. Dashboards should be interactive and intelligent with analytical reports, graphical and pictorial representations of data.

Feedback Suggestion mechanism: The system should be designed in such a manner that it will enable different users at all levels to submit feedback and suggestions on the usability and functionality of the system. Users should also be provided with a mechanism to rate the system on various aspects of the system.

The functional requirements for this module are:

a) The system shall allow users to register by providing necessary information such as name, email, and password. It shall validate the user registration information and ensure uniqueness of email addresses. It shall generate a unique user ID for each registered user,

provide a login functionality for registered users, authenticate user credentials (email and password) to grant access to the system, maintain user session information to enable persistent login, support different user roles, such as admin, farmer, agricultural expert, etc.

b) The system shall allow the admin to manage user roles and permissions, define specific permissions for each user role to control access to different modules and features, allow users to view and update their profile information.

2.8. Agro Advisory Services

Field preparation and date of sowing advisories:

The system should identify the sowing window based on historical rainfall, rainfall pattern, crop phenology data to maximize crop success and also to maximize success of seed germination and survival, advisories will be provided to the farmers on when to do field preparation and a window to sow the seed based on current soil moisture conditions and next 10-day rainfall forecast.

This also improves crop success because critical crop growth stages are considered to avoid water stress during crop growth period. This allows the comparison between crops sown at different times.

Crop stress advisory for rainfed crops:

The system should raise crop specific weekly advisories to the farm level if a particular crop is under stress and irrigation is required. It forecasts crop water demand for the next ten (10) days.

This decision support module should raise advisory on

- Crops that are in stress during critical period
- Amount of water required for productive and life-saving irrigation
- Nearby available water sources

Weather alerts:

The Indian farming community desperately needs access to weather information to in order to plan and manage their crops, and in any respective states in India with frequent variations and extreme events, this is even more critical. Considering the increasing acceptance of internet and mobile based services by the farmers, the Integrated Agriculture data hub and digital farmer services Platform should provide valuable agromet information to users through a common platform and collaborate with field officials, farmers and various weather monitoring and forecasting services to produce Value Added Agro-advisory Reports. The system should provide short range, medium range and extended weather forecasts and observed reality as various intelligence reports and at various levels illustrated below.

Key information to get are:

- Daily Weather Report
- Monsoon Status
- Districts of deficit rainfall
- Advisories & Forecasts from Indian Meteorological Department/and other agencies
- Sensor based weather bulletins

Other weather deviations and impacts on respective blocks and districts Further the advisories will be displayed in an interactive GIS and MIS as:

- Farm-wise Advisories for farmers
- Block-wise Advisories for Agri related agencies and farming groups
- District-wise Advisories for administrative purpose
- State-wise Advisories for administration and policy making
- District level Weather Forecast
- Regional Weather Forecast
- All India Weather Forecast
- SMS Advisory for farmers
- Alerts / warnings to farmers and all other stakeholders

Pest alerts

Pest alerts module of the system should provide crop-specific advisories to the field officers or farmers about areas that are likely to be prone to Pest-infested. The model should consider current weather, weather forecasts, crop phenology, and various stages of the crop development where a pest or disease could infect a crop and the favourable conditions for pest or disease to thrive.

The model should also provide these advisories at the most granular level possible, and alerts can be sent to stakeholders. There should also be the Economic Threshold Level (ETL) which indicates whether an intervention is required to prevent massive economic loss. In addition to raising advisories, the solution should also specify appropriate remedial action that needs to be done to mitigate pest risk. Actionable and timely advisories to help prevent pest and save from huge economic loss.

This helps in:

- Early identification of pest
- Reduce pesticide consumptions
- Streamlining pesticide supplies as per pest infestation zone
- Streamline scouting activity

Furthermore, the platform should be able to be upgraded for image-based pest recognition and pest ETL analysis.

Soil fertility and soil health card-based advisories

The module should utilize data from the soil health card and current fertilizer consumption for the analysis. With interactive digital map visualization, key decision makers should be able look at the current soil nutrients statistics & the SHC recommendation for the Major Nutrients like N, P & K and micronutrients deficient areas to be corrected

This should provide the user with:

- Actionable insights to get to the recommended quantity of fertilizer usage
- Identifying gaps in terms of recommended Vs. current usage
- Understanding the cost for corrective measures
- The impact of productivity due to low application of fertilizers or wrong mix of application of fertilizer
- The additional cost incurred due to the excessive application of fertilizer
- Fertilizer Indent schedule

Input Management (Seeds, Fertilizers, Manures, PPC, Machineries etc)

Integrated Agriculture data hub and digital farmer services Platform should have the feature of real time updation of the input and inventories status including the:

- Availability of key inputs such as planting materials, fertilizers, manures, PPC and their dealers
- Farmer wise quota and respective allotment information
- Machineries allotment, transfer, repair, maintenance etc. records
- Role based access to update inputs and inventory information
- Provides forecast seed/fertilizer/pesticides demand by considering various influencing factors like demand, cropping pattern, weather events etc.

Scheme onboarding

Since State Agriculture department schemes are diverse, complex in nature and will change annually based on policy makers' decisions, this module should have

- the scheme on boarding facility with custom configurations and flexible workflow pattern
- scheme-based report generation in the form of graphical representation
- Online application, processing, and approval facility (claim processing)
- Role-based access facility for various users
- Information dissemination via email, SMS and push notifications etc. should be incorporated.
- Farmer and scheme matchmaking and suggesting to farmers via mobile app, SMS or any other mean of communication.

- Manage workflow for field level officer and administrative users to spread awareness on schemes and on boarding target monitoring.
- Trend line monitoring for scheme accessibility and status of farmers availing the same.

Loss reporting by farmer/extension officer

This module should provide ability to report crop and asset loss due to natural disasters, wild animal attacks and other events etc. through a smart mobile app that is linked with helpdesk numbers.

This should enable:

- Farmers and field level officials to submit loss report with image/video-based evidence collected via smartphone application
- Link with helpdesk and have workflow to initiate validation with smartphone engaging field officials or key representatives for validation purpose
- Tracking status of loss claim
- Consolidated data generation and role-based access

The functional requirements for this module are:

a) Integration with Data Sources: The dashboard should integrate with relevant data sources, including weather stations, pest monitoring networks, soil health databases, and other information repositories. It should ensure the accuracy and timeliness of data to provide reliable and up-to-date advisory services.

b) Weather Advisory: The dashboard should provide weather advisories to help farmers plan their agricultural activities effectively. It should deliver real-time weather updates, forecasts, and alerts regarding temperature, precipitation, wind, and other weather parameters that may impact crop growth and management.

c) Sowing Date Advisory: The dashboard should provide sowing date advisories for different crops based on historical data, weather conditions, and specific geographical locations. It should recommend optimal sowing dates to maximize crop yield and minimize the risk of weather-related stress.

d) Crop Stress Advisory for Rainfed Crops: The dashboard should offer crop stress advisories specifically designed for rainfed crops. It should monitor weather patterns, soil moisture levels, and other relevant factors to identify periods of potential stress and provide recommendations for managing crop water requirements during dry spells.

e) Pest Advisory: The dashboard should deliver pest advisories to help farmers identify and manage pests effectively. It should predict pest outbreaks based on crop growth stage and

congenial condition, and to provide timely recommendations for pest control measures, including integrated pest management strategies.

f) Soil Health Card-Based Advisories: The dashboard should provide advisories based on soil health card data. It should analyze soil test results, nutrient levels, organic matter content, pH, and other relevant parameters to offer tailored recommendations for soil fertility management, including fertilizer application rates and soil amendment suggestions.

g) Scheme Information Database, Updates and Notifications: The dashboard should include a comprehensive and up-to-date database of state agriculture department schemes. It should store information on various schemes, including details, eligibility criteria, benefits, application procedures, and contact information. The dashboard should provide regular updates and notifications regarding new schemes, changes to existing schemes, application deadlines, and any important announcements related to the agriculture department schemes. Users should be able to subscribe to receive notifications of their interest.

h) Beneficiary Onboarding Target Monitoring: The dashboard should enable monitoring of beneficiary onboarding targets for each scheme. It should track and display the progress towards the target number of beneficiaries, providing real-time updates and visual representations to easily assess the achievement. The system should have required facility to update scheme wise beneficiary list periodically.

i) Integration of Input and Inventory Status: The dashboard should integrate APIs to provide real-time updates on the availability and status of key inputs such as planting materials, fertilizers, manures, and pesticides. It should reflect the current stock levels, ensuring accurate and up-to-date information for users.

j) Role-Based Access to Inputs and Inventory Information: The dashboard should provide role-based access control, allowing different users to access relevant information based on their roles and Jurisdiction. It should ensure that only authorized personnel can view and assess input and inventory data.

k) Demand Forecasting: The dashboard should provide a demand forecasting option for seed, fertilizer, and pesticide inputs. It should consider various influencing factors such as crop demand, cropping patterns, historical data, weather events, and market trends to generate accurate forecasts. This would help in planning and ensuring adequate availability of input.

l) Crop Loss Reporting Functionality Using Mobile App: The Crop loss reporting module should be integrated with a smart mobile app that enables farmers and extension officers to report losses conveniently. The app should be user-friendly, compatible with multiple mobile platforms. The module should facilitate the recording of detailed loss information, including the extent of the damage, affected crops or assets, and any supporting

documentation such as photographs or videos. The mobile shall be able capture the geolocation and timestamp of the loss report, providing accurate information about the location and time of the event. This data will assist in mapping and analyzing loss patterns.

m) Crop Loss Assessment Dashboard: The dashboard should provide a dedicated module for reporting crop and asset loss due to natural disasters, wild animal attacks, and other events. It should allow officers to assess the losses easily and efficiently. The module should classify the type of loss, such as crop loss, livestock loss, infrastructure damage, or other relevant categories. This will help in organizing and analyzing loss data effectively.

n) Personalization and Localization: The dashboard should support personalization and localization features. It should allow users to input their specific crop varieties, location, and preferences to receive customized advisory recommendations. It should also provide localized information on pest outbreaks, weather conditions, and agricultural practices relevant to the user's region.

o) User-Friendly Interface: The dashboard should have a user-friendly interface that is easy to navigate and understand. It should provide clear and concise advisories with actionable recommendations. The information should be presented in a visually appealing format, such as graphs, charts, or maps, to enhance user engagement and comprehension.

2.9. Crop Classification & Acreage Estimation via Remote Sensing

The intent of this module is to provide Crop acreage estimation based on satellite data and a comparison of cropping pattern and crop acreage against the Crop Booking data from the department and DES (Department of Economics and Statistics). The module should use remote sensing data to detect Crop type and estimate Crop acreage. The system should use both optical and microwave remote sensing data the crop acreage estimation for different crops. The module will include

- Classify crop types sown at the farm level
- This information will also be aggregated to provide visibility for crop acreage at village, block, district and state levels in both interactive GIS and MIS.

The functional requirements for this module are:

a) Integration of Satellite Data Sources: The system should integrate freely available satellite data sources such as LANDSAT, Sentinel-2, Sentinel-1, MODIS etc. It should be capable of processing satellite-specific data and utilizing different satellite image products for crop mapping.

b) AI/ML Algorithm for Crop Mapping: The system should employ AI/ML algorithms to automatically or semi-automatically map dominated crops using satellite remote sensing data.

c) Field-Level Crop Mapping: The system should enable crop mapping at the field-level by utilizing segmented field boundaries. It should utilize satellite data and AI/ML algorithms to accurately differentiate and classify crops within individual fields.

d) Aggregation of Crop Information: The system should estimate crop information at higher hierarchical levels such as village, block, district, and state by aggregating the field-level crop data. It should provide summarized crop maps and statistics at these levels to support decision-making and planning at various administrative scales.

e) User-Friendly Interface: The system should have a user-friendly dashboard interface that allows users to easily access and interpret the crop classification results. It should provide intuitive visualizations, maps, and graphs to display the crop distribution and changes over time.

2.10. Near Real-Time Crop Health Monitoring

Crop health Assessment and early detection of crop infestations are critical in ensuring good agricultural productivity. Stress associated with, for example, moisture deficiencies, insects, fungal and weed infestations, must be detected early enough to provide an opportunity for the farmer to mitigate.

NDVI based crop health monitoring help in following ways:

- will provide near real time crop health assessment at field and administrative levels
- Provide near real time understanding of crop risks

The functional requirements for this module are:

a) Satellite Image Analysis: The system should analyze satellite images to detect and track changes in crop growth and development over time. It should process the images to extract relevant information related to crop health, chlorophyll content, water content, and other indicators of growth.

b) Crop Growth Indicator Estimation: The system should estimate crop growth indicators, such as vegetation indices (e.g., NDVI - Normalized Difference Vegetation Index, EVI - Enhanced Vegetation Index, LSWI – Land Surface Water Index), from the satellite images. These indices will provide insights into the health and vigor of the crops, helping monitor changes in growth.

c) Specific Crop or All Crops Assessment: The system should offer an option to assess crop growth indicators for a specific crop or all crops. Users should be able to select the crop of interest and view the corresponding growth indicators, facilitating focused analysis and decision-making.

d) Aggregation at Village and Block Level: The system should aggregate all the crop growth indicators at the village and block level. It should provide an overview of crop growth patterns and variations within these administrative units, allowing users to assess the overall crop performance in specific areas.

e) Visualization of Crop Growth Indicators: The system should provide visualization of crop growth indicators on a user-friendly interface, such as graphs or maps. It should present the indicators in a clear and easily understandable format, enabling users to track and analyze the growth patterns of specific crops or regions.

2.11. Crop Yield Assessment & Production Cluster Management

Satellite-based crop monitoring products (e.g., crop acreage, harvest time etc.) should be used to identify dominant crops and their production flow (based on crop harvest time and area) across multiple administrative regions (e.g., block, district etc.). This information will also help in development and identification of production hotspots or clusters in multiple blocks or districts. The proposed system should have the facility to display this information in order to help the department in making appropriate decisions.

This module will:

- Provide yield estimation at farm and cluster level
- Analyze dominant crop in the region
- Inflow of produce at key locations
- Enable price forecasting

The functional requirements for this module are:

a) Yield Estimation and Mapping: The system should utilize historical data to estimate average yield for all available crops. In addition, the system also should generate ML model for yield estimation of major possible crops like paddy, wheat, maize etc. based on historical crop cutting yield data, satellite image-derived crop phenological parameters and relevant factors., to estimate dynamic yield.

b) Yield Comparison and Benchmarking: The system should allow users to compare current season yield projection against benchmark values, historical data, or regional averages. This feature will facilitate the assessment of crop performance and identification of areas for improvement.

c) Periodical Production Flow Estimation: The module should utilize crop harvest data to estimate the periodical production flow of the targeted crops in each administrative unit. This functionality will enable users to plan and manage production flow related activities efficiently.

d) Administrative Level Aggregation: The module should aggregate crop area and yield estimation data to different administrative levels, including village, block, or district. This feature will provide a comprehensive view of production clusters and aid in decision-making at various levels.

e) Production Cluster Formation: The system should include a Production Cluster Module focused on estimating the production of specific crops. It should enable the identification of crop-wise processing, storage, and marketing facility by linking to existing/proposed or traditional supply chain systems.

f) Analytics and Visualization: The module should compute analytics using crop-specific yield data. The system should generate yield maps that visually represent spatial variations in crop yield within a field. This functionality will assist users in identifying production hotspots or areas with low productivity, enabling targeted interventions and management strategies.

2.12. Soil Moisture based Irrigation

Soil Moisture gives the user the insights regarding the crops that can thrive in a location and thereby helping the planners and farmers. This dashboard should provide the user with the information pertaining to the Soil Moisture for the area of interest. The soil moisture will make use of various national and global datasets available on soil moisture, and provide farm, command area, village, block, and district level soil moisture statistics.

At present, there is no visibility of Water Flow at important points in the irrigation canal network and there is a need for decision support to advise releases based on the Soil Moisture and Crop Water requirement. This module results in transparency in water flow at different critical points in the canal network and advisories based on Soil Moisture and required water. The module would help to:

- Help understanding crop water requirement at micro level
    - Preparing canal schedules with 2 weeks of outlook
    - Monitoring command area performance

- Analyzing water use efficiency
- Enable water user groups to participate in irrigation planning

The functional requirements of this module are provided below.

a) Integration of Evapotranspiration, and Soil Water Balance Model: The dashboard should integrate algorithm related to evapotranspiration and a soil water balance model. This integration will enable the estimation of crop water requirements.

b) Integration of Input Data: The dashboard should integrate all required input data from various sources like, historical, real-time, and forecasted weather data (rainfall, temperature, humidity, wind speed etc.), soil physical properties (such as texture, depth, bulk density, water holding capacity etc.) soil moisture data from hydrological model or satellite image based, and other relevant parameters required for the soil water balance model.

c) Crop Water Requirement Calculation: The dashboard should calculate crop water requirements using the integrated soil water balance model. It should consider factors such as soil moisture levels, evapotranspiration rates, crop type, stage of growth, and other relevant parameters to estimate the amount of water needed by the crop. The system should provide projected whole season water requirement estimation, till date water requirement estimation and next one week water requirement estimation.

d) Daily Scheduled Computation: The system should compute soil moisture levels, evapotranspiration rates, and other relevant data at daily level. It should display this information in an easily accessible and understandable format, allowing users to track changes and make informed decisions regarding crop water requirements.

e) Visual Representation of Water Requirements: The dashboard should visually represent the estimated crop water requirements. It should provide charts, graphs, or other visualizations that illustrate the water demand of the crop over time. This visual representation will help users understand and manage the water needs of the crop effectively.

f) Customization and Reporting: The dashboard should allow users to customize and generate reports on crop water requirements. It should enable users to select specific time periods, crop types, or other parameters to generate customized reports that provide detailed information on water requirements for specific scenarios.

g) User-Friendly Interface: The dashboard should have a user-friendly interface that is easy to navigate and understand. It should provide clear instructions, intuitive controls, and organized layouts to enhance user experience and facilitate efficient use of the dashboard.

2.13. Harvesting Assessment via Remote Sensing

This module should leverage satellite data and provide harvesting assessment periodically to identify the percentage of harvested Area and understand time and resources required to harvest. This will help department to mobilize resources and impact of situations like COVID-19 could be impacted, as we witnessed struggle to manage resources for uninterrupted harvesting.

- This should help in assessing produce inflows at various key points like purchase centers, warehouses
- With climate forecast, it should also suggest storage options and readiness for upcoming produce
- Should help streamlining procurement process

The functional requirements for this module are:

a) Integration of Satellite Data: The dashboard should integrate with satellite data to generate information on crop harvesting progress. It should leverage remote sensing technology to capture and analyze relevant data for harvested area assessment.

b) Periodic Harvesting Assessment: The dashboard should provide periodic assessments of crop harvesting progress. It should update the percentage of harvested areas at regular intervals depending on satellite data availability or overpass frequency, allowing users to track and monitor the pace of harvesting activities.

c) User-Friendly Interface: The dashboard should have a user-friendly interface that is easy to navigate and understand. It should present the periodic crop harvesting assessment information in a clear and intuitive manner, allowing users to quickly grasp the progress and resource requirements.

2.14. Extreme Event Warning and Management

Drought

This module corresponds to the automation, tracking, and monitoring of the drought manual that was proposed by the Central Government. This should help in identifying the areas under Early season drought or late-season drought along with either severe or moderate drought.

This DSS should use data from various agencies on weather data, surface water data, and groundwater data to show status of different metrological and Hydrological drought indices, and whether a particular location is under moderate or severe drought.

It should further provide early alerts on -

- approaching droughts using Rainfall, Hydrological, Remote Sensing, and Crop Situation related indices.
- Drought severeness
- Zone mapping with drought and its intensity
- Provides estimation of impacted cropped area and relative produce loss due to drought

Floods

The Integrated Agriculture data hub and digital farmer services Platform should provide simulation as well as in depth understanding of flood impacts on cropped areas. This should enable:

- All Flood simulation and analyze impact area
- Estimate losses
- Post event analysis for the field impact
- Provide early warning advisories to farmer and administrative staffs

The functional requirements for this module are:

a) Automation, Tracking, and Monitoring: The dashboard should automate, track, and monitor the information and processes related to extreme events such as drought as per Govt. of India Drought Manual. It should provide real-time updates and notifications on the status of drought conditions in different areas, helping stakeholders take timely actions.

b) Identification of Drought Areas and Severity: The dashboard should use data from various agencies, including weather data, surface water data, and groundwater data, to identify areas experiencing early season drought or late-season drought. It should also determine the severity of the drought, categorizing it as either severe or moderate. This information will assist in making informed decisions and providing appropriate support to farmers.

c) Display of Drought Indices: The dashboard should display various meteorological and hydrological drought indices, showcasing the status of each index for different locations. It should present this information in a visually intuitive manner, enabling users to quickly understand the severity of drought conditions in specific areas.

d) Integrate Simulated Result and Flood Impact Analysis: The dashboard should integrate flood simulation results from 3rd party sources through API and provide capabilities to

understand flood prone areas and impacts on cropped areas. It should utilize simulated to visualize the potential effects of floods on agricultural land. This feature will assist in planning and mitigating the impact of floods on crops.

e) User-Friendly Interface: The dashboard should have a user-friendly interface that is easy to navigate and understand. It should provide clear visualizations, intuitive controls, and personalized settings to enhance user experience and enable efficient decision-making.

2.15. Crop Loss Assessments

The system should leverage remote sensing technology clubbed with AIto assess the impact of weather conditions on the crop to understand the crop loss. It should also help in assessing the loss in account of extreme weather events like cyclone, hailstorm, or flood.

By using technology, it would help in:

- Save time and resources for the extensive task of loss estimation
- Eliminate conflicts between stakeholders
- Faster processing of support to the farmers

The functional requirements for this module are:

a) Remote Sensing Data and AI/ML Integration: The system should integrate remote sensing Data and AI/ML capabilities to assess the crops area. This integration will enable the system to gather and analyze relevant data for accurate estimation of standing crop area.

b) Extreme Event Impact Assessment: The system should be capable of assessing the impact of extreme weather events on crops by analyzing remote sensing data. It should provide insights into the extent of crop damage or loss caused. This would enable quick assessment, effective response, and support measures.

c) Loss Estimation Automation: The system should automate the process of loss estimation, saving time and resources that would otherwise be required for extensive manual assessment. By leveraging remote sensing technology and AI, it should efficiently analyze relevant data and provide accurate estimates of crop loss, reducing the burden on stakeholders involved in the process.

d) Event-Specific Loss Analysis: The dashboard should provide event-specific loss analysis for extreme weather events. It should offer a breakdown of the crop loss associated with each event, enabling users to understand the impact of individual weather events on different crops and regions.

e) User Friendly Dashboard and Analytics: The dashboard should have an intuitive and user-friendly interface that allows users to easily navigate and access relevant information. It should be designed in a way that enables users to understand and interpret the data related to weather conditions and crop loss without requiring extensive technical knowledge.

2.16. Crop Insurance

Under crop insurance module, numerous involved processes such as insurance enrolments, eligibility for claims, field validations, pay outs etc. shall be digitized right from registering farmers on a centralized platform to making certain that they are the right beneficiaries receiving fair pay outs. On the other hand, advanced technological innovations such as satellite image processing coupled with artificial intelligence and deep learning enable a more accurate assessment of farmlands, The solution should help in:

- Enrolment of loaned and non-loaned farmers
- Validation of crop loss declaration by the farmer
- Validation of compensation resolution
- CCE based validation.
- Advisories on potential losses/damages
- Ensure timely and fair pay outs

The functional requirements for this module are:

a) Integration of Insurance Database: The system should integrate crop insurance database from various sources though APIs to regularly fetch and store all relevant information related to crop insurance.

b) Insurance Coverage Analysis: The system should provide a facility for analyzing insurance coverage based on the spatial distribution of crop-wise coverage area. It should utilize geospatial data to visualize and analyze the extent of insurance coverage for different crops and regions.

c) Insured Crop validation Mechanism and Discrepancy Resolution: The system should store and compare the insured crop area with the actual crop area to identify any discrepancies. It should provide mechanisms such as Mobile app based periodical crop photo submission for analyzing and resolving discrepancies, ensuring accurate and fair insurance coverage.

d) Digitization of Processes: The system should digitize various processes involved in crop insurance, including farmer registrations, eligibility determination, field validations etc. It

should provide a centralized platform for managing and streamlining these processes, ensuring transparency and efficiency.

e) User-Friendly Interface: The system should have a user-friendly web-dashboard and mobile app that allows users to easily access and interact with the crop insurance functionalities. It should provide intuitive visualizations, reports, and tools to facilitate decision-making and streamline insurance processes.

2.17. Centralized DBT Management

A Centralized Direct Benefit Management System should be provided in Integrated Agriculture data hub and digital farmer services Platform to enable the department and stakeholders to distribute assistance directly to the bank account of beneficiaries. System shall be integrated with state specific treasury systems, PFMS by central government, any payment system approved by RBI, and adopted by the department through API to enable payment, update status etc. This should provide dashboard and analytics for:

- Various schemes and respective beneficiaries as per zone, districts, blocks and villages
- Provide status of disbursement under each scheme
- Provide gap analysis in scheme and beneficiary
- Track farmer level DBTs
- Scheme efficiency and accessibilities reports

The functional requirement for this module is provided below:

a) API Integration for DBT Status Updates: The system shall use APIs provided by State Treasury Systems, Public Financial Management System, and any possible available system to integrate with the DBT database. This integration will facilitate seamless connectivity with financial institutions' transactions status updates.

b) Dashboard and Analytics: The system should provide a comprehensive dashboard and analytics functionality. This feature will allow stakeholders, including the department and other authorized entities, to access real-time information and insights regarding the direct benefit transfer process. The dashboard should include visualizations, reports, and analytics related to the distribution of benefits, payment status, beneficiary data, and any other relevant metrics. The dashboard also shall display a spatial map showing distribution of beneficiary, payment status and payment gap.

2.18. Farm Mechanization

Mechanization of agriculture is an essential input in modern agriculture. It enhances productivity, besides reducing human drudgery and cost of cultivation. Because crops are location-based, this makes Geographic Information Systems (GIS) an extremely relevant tool for farmers. The information about agriculture machinery should be made available on the GIS layer which should give understanding of which area needs more mechanization. This helps planning intervention in the time of stress and also helps understand requirement of machineries and related services. Enhancements in farm mechanization will improve timely operations in view of labour shortage due to pandemics like COVID-19.

The functional requirement for this module is provided below:

a) Integration of Agriculture Machinery database with GIS: The system should integrate database about agriculture machinery with the GIS layer. This integration shall allow the user to visualize the machinery distribution under multiple categories in specific areas.

b) Mapping Machinery Distribution: The system should map the distribution of agriculture machinery across different locations. This functionality shall provide the user with a clear understanding of the availability and concentration of machinery in specific areas.

c) Machinery Requirement Assessment: The GIS layer should assist in assessing the machinery requirements for different regions. By analyzing factors such as crop types, farm sizes, and geographical conditions, the system should provide recommendations on the types and quantities of machinery needed to meet the specific agricultural demands of each area. This shall help the decision maker or policy maker to make an informed decision on a new scheme or policy design.

2.19. Farmer Helpdesk

The Indian farmers are second to none in production and productivity despite of the fact that millions are marginal and small farmers and the same is true for every place. It is felt that with provision of timely and adequate inputs such as fertilizers, seeds, pesticides, technical support, assistance and by making available affordable agricultural credit /crop insurance, farmers are going to ensure food and nutritional security to the nation. For the same, a farmer support portal is envisioned where they can raise their issues or support request which can be monitored and managed via a single authoritative system. It is envisaged to make available relevant information and services to the farming community and private sector through the use of information and communication technologies, to supplement the existing delivery channels provided for by the department. Farmers' Portal is an endeavour in this direction to create one stop shop for meeting all informational needs relating to Agriculture.

Once in the Farmers' Portal, a farmer should be able to get all relevant information on specific subjects and State Government schemes around his farm/village/block/district or State. This

information should be delivered in the form of text, SMS, email, and audio/video in the language he or she understands. Farmers should also be able to ask specific queries as well as give valuable feedback through the Feedback module specially developed for the purpose. The development of this module will span through:

- Create user roles
- Farmer can get information about their farm and Soil test reports specific
- Farmer can request assistance via support portal or mobile app
- Farmer Grievances redressal both geoportal and mobile app
- GIS-based layer for reporting on map on grievances
- Information on Central and State Government schemes
- Self-learning module

The functional requirements for this module are provided below:

a) Centralized Information Access: The Farmers' Portal should provide all relevant information on related to farming and related to various agriculture schemes provided by Central and State Government. The portal should present this information in various formats such as text, SMS, email, audio, and video, ensuring accessibility and comprehension in the preferred language of the farmers.

b) Grievances and Support Request Management: The farmer support portal should provide a feature for farmers to raise their grievances or support requests. These requests should be monitored and managed through a single authoritative system, ensuring efficient tracking and resolution of farmer concerns.

c) Interactive Query System: Farmers should have the capability to ask specific queries related to agriculture. The portal should provide an interactive query system where farmers can submit their questions and receive prompt and accurate responses from experts or relevant authorities.

d) Feedback Module: The portal should include a dedicated feedback module that allows farmers to provide valuable feedback. This module should facilitate easy submission of feedback, suggestions, and comments about the benefits or demerits about various schemes, policy etc.

2.20. Soil Information Module

Nutrient & fertilizer advisories

- Soil nutrient-based fertilizer advisory aims to provide customized fertilizer recommendations to farmers based on the specific nutrient requirements of their crops and the nutrient content of their soil. This approach ensures optimal crop growth, minimizes environmental impact, and increases cost-effectiveness. The platform should deliver soil nutrient-based fertilizer advisory:

- Soil analysis: Analyze the soil samples reports to determine the nutrient content, such as nitrogen (N), phosphorus (P), potassium (K), and micronutrients. Also, analyze other soil properties, like pH, organic matter, and soil texture, which can influence nutrient availability and fertilizer efficiency.

    - Crop-specific nutrient requirements: Identify the specific nutrient requirements for the target crop which are paddy and wheat, taking into account factors like growth stage, expected yield, and local agronomic practices. These requirements can be derived from existing guidelines, research, or agronomic models.

- Fertilizer recommendations: Develop customized fertilizer recommendations based on the crop-specific nutrient requirements and the soil analysis results. Calculate the optimal amounts of N, P, K, and other essential nutrients that need to be applied to the field to ensure optimal crop growth and yield.

This should be provided as GIS layer to do analysis at field level as well as aggregate level.

Soil Carbon mapping

Soil carbon mapping is the process of estimating and visualizing the spatial distribution of soil organic carbon (SOC) in a given area. This information is vital for understanding soil health, managing agricultural practices, and monitoring carbon sequestration.

- Soil sampling: System should integrate with collected soil samples from the study area, ensuring appropriate spatial coverage and sampling depth. Sampling depth is crucial, as soil carbon content may vary with depth. The data should be geotagged and relayed as a GIS Layer.

- Soil analysis: System should integrate reports of soil carbon analysis to determine their SOC content. Other soil properties, such as pH, texture, and bulk density, information should also be captured from the test report to provide additional information about the soil's characteristics.

- Statistical or machine learning models: Develop a model to predict SOC content based on the soil samples and ancillary data. This can be achieved using various statistical methods (e.g., regression, kriging) or machine learning techniques (e.g., random forest, support vector machines). The choice of method depends on the data's characteristics and the desired accuracy of the predictions.

- Model validation: Validate the model using a subset of soil samples not used during model development. This provides an estimate of the model's predictive accuracy and helps identify areas for improvement.

- SOC prediction: Apply the validated model to the entire study area to generate predictions of SOC content for unsampled locations. This results in a continuous map of predicted SOC values across the study area.

- Visualization: Create a visual representation of the soil carbon map using appropriate color schemes and symbology as GIS layer, from field level till state and country level.

Soil Physics

Beyond nutrient analysis of the soil, it is important to create soil's physical characteristics at different depths like its water holding capacities, wilting points, percolation, bulk density, and other dynamics which are necessary to water retentions and balance to make it available to the roots. This module should serve following purpose:

- Soil Nutrient Repository which will provide nutrient wise map across the country with drill down to villages and plots, by combining data from soil health card surveys, continuous lab test, and nutrient sensors.

- Fertilizer recommendation to farmers based on the projected nutrient content at his farm, and selected crop.

- Fertilizer indentation at state level by combining soil nutrient layer and crop map layer.

- The functional requirements for this module are:

- Integration with State and Central Soil Databases: The Soil Information module should seamlessly integrate with state and central soil databases to access comprehensive soil health card data. This integration enables the system to gather relevant information for soil analysis and assessment.

- Soil Data Analysis The system should perform in-depth analysis of soil data, considering various variables such as nutrient content, pH levels, and texture. The System shall utilize available soil samples to perform the spatial and statistical analysis.

- Soil Fertility Analysis: The module should offer analysis of soil fertility to assess specific nutrient requirements of crops and the nutrient content of the soil. This analysis should guide decision makers to determine the appropriate fertilizers and application rates for optimal crop growth, while minimizing environmental impact and maximizing cost-effectiveness.

- Soil Carbon Mapping: The system should include functionality for estimating and visualizing the spatial distribution of soil organic carbon (SOC) within a given area. System may use existing soil sample from pilot studies to train ML model to predict the SOC content. This capability would provide valuable information for understanding soil health, managing agricultural practices, and monitoring carbon sequestration efforts.

2.21. Integration with E-Market Places

The Integrated Agriculture data hub and digital farmer services Platform should integrate with all leading e-marketplaces as well as online mandi prices to forecast as well as show live prices for various crops and commodities. This should also show the historical trend line for production vs price to help understand price fluctuations at micro level.

Further, acreage and yield forecasts at cluster level early in the production cycle should help streamline marketplace activities for both farmers and administrators.

These analytics will help stakeholders in key areas which involve:

- planning, organizing, directing, and handling of agricultural produce in such a way as to satisfy farmers, intermediaries, and consumers.

- employing the latest technologies like AI, Blockchain technology etc.

- System shall provide latest information regarding market location, status, and price

- Record and show transaction details, farmer, dealer, purchase goods information etc.

- provide localized market price and commodity availability forecasting and now casting.

- provide crop production estimates at various levels and shall aid in glut management.

The functional requirements of this module are provided below:

a) Integration with Leading E-Marketplaces and Online Mandi Prices: The system should seamlessly integrate with all major e-marketplaces and online mandi platforms to gather real-time data on prices for various crops and commodities. This integration will enable the platform to display live prices and forecast future prices (if available) accurately.

b) Live and Historical Price Display: The platform should provide live price information for crops and commodities, sourced from integrated e-marketplaces and online mandi platforms. Additionally, it should display historical trend lines depicting the relationship between production and prices, allowing users to understand price fluctuations at a micro level.

c) Market Information: The system should offer up-to-date information on market locations, their status, and prevailing prices. Users should be able to access this information to make informed decisions regarding their agricultural activities.

d) Localized Market Price and Commodity Availability Status: The system should provide localized market price status for different regions,

e) User Friendly Dashboard: The information shall be presented in very user-friendly dashboard with spatial maps (if applicable), charts, tables etc.

2.22. Water Resource Information for Irrigation Potential

The system should be designed to automatically ingest any form of data from various sources like satellite, sensors, mobile App, any model, or 3rd party data sources. The system should further perform validation of the incoming data and transforms it into various water demand, water supply, and environment-related component.

The system should be made flexible to integrate various computational and analytical components through API if required.

- Ready off the Shelve Hydrology or other Scientific models
- Construct new Scientific simulation models
- Build optimization models
- Deploy Machine learning and Artificial Intelligence algorithms

The processed information should be consumed by various decision support modules to provide dashboards and actionable insights. Finally, results, information, and data shall be presented to different users through MIS / GIS dashboard, Mobile APP, or SMS, etc.

The key functionality of water Resource Information inside The Integrated Agriculture data hub and digital farmer services Platform are:

a) Water Balance and Water Audit: Water Audit to provide a data-driven hydrological framework that facilitates traceability and accounting of the water resources across the state. It should provide realistic assessment of supply, storage, usages, losses and outflows in the present or an earlier “water year”.

b) Village Water Budget: An interactive Decision Support system at a village level, that is based on current Supply and Demand is required for the village. This module should give visibility over surplus and deficit areas at a village level.

c) Ground Water Resource Estimation: Estimating Ground Water Resources is done manually at present and there is a need to automate Ground Water Assessment, Categorization, and Evaluation. This helps in understanding and visualizing the areas that are at various stages of exploitation of groundwater. This module should identify the villages and areas where Dynamic GW is Over Exploited, Under Exploited and Safe. Also, better Water Conservation Management based on GW Recharge, draft, and potential.

3. Hosting

The System will be hosted on MEiTY empaneled cloud and managed during the development period and 60 months after Go-Live. All the components of the System will be directly hosted on cloud including AI models.

4. Maintenance Support

Five years of operation and maintenance support will cover system upkeep, bug patches, and any new data formats or reports inside the modules created during this project.

SECTION -3 ANNEXURES

1. Annexure I - Format for submitting Technical Bid

(No financials to be mentioned in this)

S. No.	Particulars	Details
1.	**Basic:**	
	a) Firm's Name	
	b) Date of Incorporation	
	c) Certificate of Incorporation Number	
	d) GST No.	
	e) PAN No.	
	f) Corporate Office Address	
	• Contact Person	
	• Phone No.(landline/Mobile)	
	• Fax No.	
	Email address:	

2. Annexure II - Annual Sales Turnover Statement

Date: __/__/____

This is to certify that we M/s_____ are the statutory Auditors of M/s_____ and that the below mentioned calculations are true as per the Audited Financial Statements of M/s_____ for the below mentioned years.

S/N	**Turnover**	FY 2020-2021	FY 2021-2022	FY 2022-2023
1	Annual Turnover			
2	Net worth as per Audited Balance Sheet			
	Average Turnover			

(Signature of the Chartered Accountant)

Name and Seal

3. Annexure III - Format for Past Assignments

Project/ Assignment Name:	Country:
Project Location within the Country:	No. of Professional Staff:
Name of Funding Agency \ Client:	Value of the Project:
Start Date:	Completion Date:
Name of Associated Firms (s) if any:	
Components and Features of the System • Cloud based System. • Open source • AI-ML based Algorithms • GIS application for agriculture & allied, Water, Soil, Weather • extreme event warning such Water stress, Pest Stress, Flood, Heat Wave, Drought, Cyclone	
Detailed Description of Actual Services Provided by your Company:	

(Separate sheets may be used for each Project as required)

4. Annexure IV- Format for Submitting Commercial Bid

(On the Letter Head)

The Bidder has to Quote in PART A and PART B. The Amount Quoted should be for Development and Implementation of Integrated agriculture data hub and digital farmer services platform and Operation & maintenance for 1 (One) State.

PART-A

S No.	Deliverable/Items	UoM	Units	Unit Cost	Total	GST/Taxes	Total including GST (INR)
A	B	C	D	E	F= D*E	G	F+G
Part – A Integrated agriculture data hub and digital farmer services platform (CaPex) *For CAPEX - All the payments during the Development and Implementation period will be based on milestone completions to a cumulative value of 50% of the quoted value for Development Integrated Agriculture Data Hub and Digital Farmer Service Platform (CapEx). For the remaining part of the 50% of the CAPEX value, bidder will fund through its own sources (example: If quoted CAPEX value is 100, bidder will be remunerated 50, and remaining 50 will need to be funded by bidder through its own source)* *CaPEX = 100% Cost of Development of Integrated Agriculture Data Hub and Digital Farmer Service Platform. Bidders need to quote Total 100%.*							
1	Development of Integrated Agriculture data hub and digital farmer services Platform	Lumpsum Module	1				
2	Unified agriculture database	Lumpsum Module	1				

S No.	Deliverable/Items	UoM	Units	Unit Cost	Total	GST/Taxes	Total including GST (INR)
3	Geoportal and Mobile Application	Lumpsum Module	1				
4	AI Based farm boundary detection	Lumpsum Module	1				
5	Unified farmer database	Lumpsum Module	1				
6	Farmer and Admin user accessibility	Lumpsum Module	1				
7	Crop Classification & acreage estimation via remote sensing	Lumpsum Module	1				
8	Harvesting assessment via remote sensing	Lumpsum Module	1				
9	Farmer Helpdesk	Lumpsum Module	1				
10	Soil Information Module	Lumpsum Module	1				
11	Agro-climatic crop zone planning	Lumpsum Module	1				
12	Near real-time crop health monitoring	Lumpsum Module	1				
13	Crop yield assessment & Production cluster management	Lumpsum Module	1				
14	Soil Moisture based irrigation	Lumpsum Module	1				
15	Extreme event warning and management	Lumpsum Module	1				
16	Crop loss prediction & assessments	Lumpsum Module	1				
17	Farm mechanization	Lumpsum Module	1				

S No.	Deliverable/Items	UoM	Units	Unit Cost	Total	GST/Taxes	Total including GST (INR)
18	Agro advisory services	Lumpsum Module	1				
19	Centralized DBT Management	Lumpsum Module	1				
20	Farming the carbon (GHG emission, carbon sequestration, carbon credit)	Lumpsum Module	1				
21	Crop insurance	Lumpsum Module	1				
22	Integration with e-marketplaces	Lumpsum Module	1				
23	Water resource information for Irrigation potential	Lumpsum Module	1				
Total Development of Integrated Agriculture data hub and digital farmer services Platform (CapEx)=							

Part B

Hosting, Operation and Maintenance Per each Year (OpEx).

All the payments during the Operation and Maintenance period will be based on Quarterly basis to a cumulative annual maximum value of 50% of the quoted annual Operation and Maintenance cost for Integrated Agriculture Data Hub and Digital Farmer Service Platform (OpEx). For the remaining part of the 50% of the annual OpEx value, bidder will fund through its own sources, (example: if the quoted OpEx value is 100, 12.5 will be paid each quarter to a maximum of 50 in a year, remaining part needs to be funded by bidder through its own source)

OpEx =100%Cost of Operation and Maintenance per year. Bidders need to Quote for 100%.

#	Deliverable/Items	UoM	Units	Unit Cost	Total	GST/Taxes	Total including GST (INR)
A	B	C	D	E	F= D*E	G	F+G
1	Hosting	Year	1				
2	Operation and Support	Year	1				
3	Maintenance	Year	1				
Total Hosting, Operation and Maintenance per year (OpEx) =							

Summary	
Details	**Total including GST (INR)**
Part – A Integrated agriculture data hub and digital farmer services platform	
Part – B Total Hosting, Operation and Maintenance Per each Year (OpEx) =	
Total PART A + PART B for one State=	

Authorized Signatory, Name and Seal

SECTION -4 SAMPLE CONTRACT

Memorandum of Understanding
for
Integrated Agriculture Data Hub and Digital Farmer Services Platform

I. Form - Memorandum of Understanding

This MEMORANDUM OF UNDERSTANDING (hereinafter called the "Memorandum of Understanding") is made on the _____, between, on the one hand, (hereinafter called the "Client") and, on the other hand, (hereinafter called the "Consultant").

WHEREAS

(a) The Client has requested the Consultant to provide certain consulting services in co-investment and revenue sharing mode project for Design, develop and assist in implementation of Integrated Agricultural Data Hub and Digital Farmer Services Platform as defined in this Memorandum of Understanding (hereinafter called the "Services");

(b) The Consultant, having represented to the Client that it has the required professional skills, expertise and technical resources, has agreed to provide the Services on the terms and conditions set forth in this Memorandum of Understanding.

NOW THEREFORE the parties hereto hereby agree as follows:

1. The following documents attached hereto shall be deemed to form an integral part of this Memorandum of Understanding:

    (a) The General Conditions of Memorandum of Understanding;
    (b) The Special Conditions of Memorandum of Understanding;
    (c) Appendices:
    Appendix A: Selection Notice
    Appendix B: Terms of Reference.
    Appendix C: Project Completion Timelines
    Appendix D: Break Down of Memorandum of Understanding Price

2. The mutual rights and obligations of the Client and the Consultant shall be as set forth in the Memorandum of Understanding, in particular:

    (a) The Consultant shall carry out the Services in accordance with the provisions of the Memorandum of Understanding.

    (b) The Client shall make payments to the Consultant in accordance with the provisions of the Memorandum of Understanding.

IN WITNESS WHEREOF, the Parties hereto have caused this Memorandum of Understanding to be signed in their respective names as of the day and year first above written.

For and on behalf of NABARD Consultancy Services Pvt. Ltd

1. Witness

Name and Signature

2. Witness

For and on behalf of [selected Subconsultant]

Name and Signature

II. General Conditions of Memorandum of Understanding

A. General Provisions

1. Definitions

1.1. Unless the context otherwise requires, the following terms whenever used in this Memorandum of Understanding have the following meanings:

a) "Applicable Guidelines" means the Guidelines for Selection and Employment of Consultants under the rules of Government of India or any respective State Government

b) "Applicable Law" means the laws and any other instruments having the force of law in the Client's country, or in such other country as may be specified in the **Special Conditions of Memorandum of Understanding (SCMoU)**, as they may be issued and in force from time to time.

c) "Client" means the implementing agency representing NABARD Consultancy Services Pvt. Limited that signs the Memorandum of Understanding for the Services with the Selected Consultant.

d) "Consultant" means a legally established professional consulting firm or entity selected by the Client to provide the Services under the signed Memorandum of Understanding.

e) "Memorandum of Understanding" means the legally binding written agreement signed between the Client and the Consultant and which includes all the attached documents listed in its paragraph 1 of the Form of Memorandum of Understanding (the General Conditions (GCMoU), the Special Conditions (SCMoU), and the Appendices).

f) "Day" means a working day unless indicated otherwise.

g) "Effective Date" means the date on which this Memorandum of Understanding comes into force and effect pursuant to Clause GCMoU 11.

h) "Foreign Currency" means any currency other than the currency of the Client's country.

i) "GCMoU" means these General Conditions of Memorandum of Understanding.

j) "Government" means the government of the Client's State.

k) "Joint Venture (JV)" means an association with or without a legal personality distinct from that of its members, of more than one entity where one member has the authority to conduct all businesses for and on behalf of any and all the members of the JV, and where the, members of the JV are severally liable to the client for the performance of the Memorandum of Understanding

l) "Local Currency" means the currency of the Client's country.

m) "Party" means the Client or the Consultant, as the case may be, "Parties" means both of them.

n) "SCMoU" means the Special Conditions of Memorandum of Understanding by which the GCMoU may be amended or supplemented but not over-written.

o) “Services” means the work to be performed by the Consultant pursuant to this Memorandum of Understanding, as described in Appendix B hereto.

p) “Sub-consultants” means an entity to whom/which the Consultant selects and assigns/subcontracts any part of the Services.

q) “Third Party” means any person or entity other than the Government, the Client, the Consultant or a Sub-consultant

2. Relationship between the Parties

2.1. Nothing contained herein shall be construed as establishing relationship of master and servant or of principal and agent as the Client and the Consultant. The Consultant, subject to this Memorandum of Understanding, has complete charge of the Experts and Sub-consultants, if any, performing the Services and shall be fully responsible for the Services performed by them or on their behalf hereunder.

3. Law Governing Memorandum of Understanding

3.1. This Memorandum of Understanding, its meaning and interpretation, and the relation between the Parties shall be governed by the Applicable Law

4. Language

4.1. This Memorandum of Understanding has been executed in the language specified in the SCMoU, which shall be the binding and controlling language for all matters relating to the meaning or interpretation of this Memorandum of Understanding

5. Headings

5.1. The headings shall not limit, alter or affect the meaning of this Memorandum of Understanding.

6. Communications

6.1. Any communication required or permitted to be given or made pursuant to this Memorandum of Understanding shall be in writing in the language specified in Clause GCMoU 4. Any such notice, request or consent shall be deemed to have been given or made when delivered in person to an authorized representative of the Party to whom the communication is addressed, or when sent to such Party at the address specified in the SCMoU

6.2. A Party may change its address for notice hereunder by giving the other Party any communication of such change to the address specified in the SCMoU

7. Location

7.1. The Services shall be performed at such locations as are specified in Appendix B hereto and, where the location of a particular task is not so specified, at such locations, whether in the Government's country or elsewhere, as the Client may approve

8. Authority of Member in Charge

8.1. In the case the Consultant is a Joint Venture, the members hereby authorize the member specified in the SCMoU to act on their behalf in exercising all the Consultant's rights and obligations towards the Client under this Memorandum of Understanding, including without limitation the receiving of instructions and payments from the Client.

9. Authorized Representatives

9.1. Any action required or permissions to be obtained, and any document/representatives required or permitted to be executed under this Memorandum of Understanding by the Client or the Consultant may be taken or executed by the authorized officials specified in the SCMoU.

10. Corrupt and Fraudulent Practices

10.1. The Client requires the Consultant to disclose any commissions or fees that may have been paid or are to be paid to agents or any other Party with respect to the selection process or execution of the Memorandum of Understanding.

A) Commissions and Fees

10.2. The information disclosed must include at least the name and address of the agent or other party, the amount and currency, and the purpose of the commission, gratuity or fee. Failure to disclose such commissions, gratuities or fees may result in termination of the Memorandum of Understanding and/or sanctions by the Client

B. Commencement, Completion, Modification and Termination Of Memorandum of Understanding

11. Effectiveness of the Memorandum of Understanding

11.1. This Memorandum of Understanding shall come into force and effect on the date (the "Effective Date") of the Client's notice to the Consultant instructing the Consultant to begin carrying out the Services. This notice shall confirm that the effectiveness conditions, if any, listed in the SCMoU have been met

12. Termination of Memorandum of Understanding for Failure to Become Effective

12.1. If this Memorandum of Understanding has not become effective within such time period after the date of Memorandum of Understanding signature as specified in the SCMoU, either Party may, by not less than Thirty (30) days written notice to the other Party, declare this Memorandum of Understanding to be null and void, and in the event of such a declaration by either Party, neither Party shall have any claim against the other Party with respect hereto

13. Commencement of Services

13.1. The Consultant shall confirm availability of relevant Resources, expertise & Sub Consultant/Vendors/Developer and begin Services carrying out the Services not later than the number of days after the Effective Date specified in the SCMoU.

14. Expiration of Memorandum of Understanding

14.1. Unless terminated earlier pursuant to Clause GCMoU 19 hereof, this Memorandum of Understanding shall expire at the end of such time period after the Effective Date as specified in the SCMoU.

15. Entire Agreement

15.1. This Memorandum of Understanding contains all covenants, stipulations and provisions agreed by the Parties. No agent or representative of either Party has authority to make, and the Parties shall not be bound by or be liable for, any statement,

representation, promise or agreement not set forth herein.

16. Modifications or Variations

16.1. Any modification or variation of the terms and conditions of this Memorandum of Understanding, including any modification or variation of the scope of the Services, may only be made by written agreement between the Parties. However, each Party shall give due consideration to any proposals for modification or variation made by the other Party.

17. Force Majeure

a) Definition

17.1. For the purposes of this Memorandum of Understanding, "Force Majeure" means an event which is beyond the reasonable control of a Party, is not foreseeable, is unavoidable, and makes a Party's performance of its obligations hereunder impossible or so impractical as reasonably to be considered impossible under the circumstances, and subject to those requirements, includes, but is not limited to, war, riots, civil disorder, earthquake, fire, explosion, storm, flood or other adverse weather conditions, strikes, lockouts or other industrial action confiscation or any other action by Government agencies

17.2. Force Majeure shall not include (i) any event which is caused by the negligence or intentional action of a Party or such Party's Experts, Sub consultant/Vendors/Developer or agents or employees, nor (ii) any event which a diligent Party could reasonably have been expected to both take into account at the time of the conclusion of this Memorandum of Understanding, and avoid or overcome in the carrying out of its obligations here under

17.3. Force Majeure shall not include in sufficiency of funds or failure to make any payment required hereunder

b) No Breach of Memorandu of of Understanding

17.4. The failure of a Party to fulfil any of its obligations hereunder shall not be considered to be a breach of, or default under, this Memorandum of Understanding in so far as such inability arises from an event of Force Majeure, provided that the Party affected by such an event has taken all reasonable precautions, due care and reasonable alternative measures, all with the objective of carrying out the terms and conditions of this Memorandum of Understanding.

c) Measures to be Taken

17.5. A Party affected by an event of Force Majeure shall continue to perform its obligations under the Memorandum of Understanding as far as is reasonably practical and shall take all reasonable measures to minimize the consequences of any event of Force Majeure.

17.6. A Party affected by an event of Force Majeure shall notify the other Party of such event as soon as possible, and in any case not later than fourteen (14) calendar days following the occurrence of such event, providing evidence of the nature and cause of such event, and shall similarly give written notice of the restoration of normal conditions as soon as possible.

17.7. Any period within which a Party shall, pursuant to this Memorandum of Understanding, complete any action or task, shall be extended for a period equal to the time during which such Party was unable to perform such action as a result of Force Majeure.

17.8. During the period of their inability to perform the Services as a result of an event of Force Majeure, the Consultant, upon instructions by the Client, shall either:

a) demobilize, in which case the Consultant shall be reimbursed for additional costs they reasonably

and necessarily incurred, and, if required by the Client, in reactivating the Services; or

b) Continue with the Services to the extent reasonably possible, in which case the Consultant shall continue to be paid under the terms of this Memorandum of Understanding and be reimbursed for additional costs reasonably and necessarily incurred.

17.9. In the case of disagreement between the Parties as to the existence or extent of Force Majeure, the matter shall be settled according to Clauses GCMoU 44 & 45.

18. Suspension

18.1. The Client may, by written notice of suspension to the Consultant, suspend all payments to the Consultant hereunder if the Consultant fails to perform any of its obligations under this Memorandum of Understanding, including the carrying out of the Services, provided that such notice of suspension (i) shall specify the nature of the failure, and (ii) shall request the Consultant to remedy such failure within a period not exceeding thirty (30) calendar days after receipt by the Consultant of such notice of suspension.

19. Termination

a) By the Client

19.1. This Memorandum of Understanding may be terminated by either Party as per provisions set up below:

19.1.1. The Client may terminate this Memorandum of Understanding in case of the occurrence of any of the events specified in paragraphs (a) through (f) of this Clause. In such an occurrence the Client shall give at least thirty (30) calendar days' written notice of termination to the Consultant in case of the events referred to in (a) through (d); at least sixty (60) calendar days' written notice in case of the event referred to in (e); and at least five (5) calendar days' written notice in case of the event referred to in (f):

a) If the Consultant fails to remedy a failure in the performance of its obligations hereunder, as specified in a notice of suspension pursuant to Clause GCMoU 18;

b) If the Consultant becomes (or, if the Consultant consists of more than one entity, if any of its members becomes) insolvent or bankrupt or enter into any agreements with their creditors for relief of debt or take advantage of any law for the benefit of debtors or go into liquidation or receivership whether compulsory or voluntary.

c) If the Consultant fails to comply with any final decision reached as a result of arbitration proceedings pursuant to Clause GCMoU 45.1;

d) If, as the result of Force Majeure, the Consultant is unable to perform a material portion of the Services for a period of not less than sixty (60) calendar days.

e) If the Client, in its sole discretion and for any reason whatsoever, decides to terminate this Memorandum of Understanding.

f) If the Consultant fails to confirm availability of Key Experts as required in Clause GCC 13

19.1.2. Furthermore, if the Client determines that the Consultant has engaged in corrupt, fraudulent, collusive, coercive, or obstructive practices, in competing for or in executing the Memorandum of Understanding, then the Client may, after giving seven (7) calendar days written notice to the Consultant, terminate the Consultant's employment under the Memorandum of Understanding.

19.1.3. The Consultant may terminate this Memorandum of Understanding, by not less than forty-five (45) calendar days' written notice to the Client, in case of the occurrence of any of the events specified in paragraphs (a) through (d) of this Clause.

b) By the Consultant

a) If the Client fails to pay any money due to the Consultant pursuant to this Memorandum of Understanding and not subject to dispute pursuant to Clauses GCMoU 45.1 within forty-five (45) calendar days after receiving written notice from the Consultant that such payment is overdue.

b) If, as the result of Force Majeure, the Consultant is unable to perform a material portion of the Services for a period of not less than sixty (60) calendar days.

c) If the Client fails to comply with any final decision reached as a result of arbitration pursuant to Clause GCMoU 45.1.

d) If the Client is in material breach of its obligations pursuant to this Memorandum of Understanding and has not remedied the

same within forty-five (45) days (or such longer period as the Consultant may have subsequently approved in writing) following the receipt by the Client of the Consultant's notice specifying such breach.

c) Cessation of Rights and Obligations

19.1.4. Upon termination of this Memorandum of Understanding pursuant to Clauses GCMoU 12 or GCMoU 19 hereof, or upon expiration of this Memorandum of Understanding pursuant to Clause GCMoU 14, all rights and obligations of the Parties hereunder shall cease, except (i) such rights and obligations as may have accrued on the date of termination or expiration, (ii) the obligation of confidentiality set forth in Clause GCMoU 22, (iii) the Consultant's obligation to permit inspection, copying and auditing of their accounts and records set forth in Clause GCMoU 25, and (iv) any right which a Party may have under the Applicable Law.

d) Cessation of Services

19.1.5. Upon termination of this Memorandum of Understanding by notice of either Party to the other pursuant to Clauses GCMoU 19a or GCMoU 19b, the Consultant shall, immediately upon dispatch or receipt of such notice, take all necessary steps to bring the Services to a close in a prompt and orderly manner and shall make every reasonable effort to keep expenditures for this purpose to a minimum. With respect to documents prepared by the Consultant and equipment and materials furnished by the Client, the Consultant shall proceed as provided, respectively, by Clauses GCMoU 27 or GCMoU 28.

19.1.6. Upon termination of this Memorandum of Understanding, the Client shall make the

following payments to the Consultant:

e) Payment upon Termination

a) Payments for Services satisfactorily performed prior to the effective date of termination and

b) in the case of termination pursuant to paragraphs (d) and (e) of Clause GCMoU 19.1.1, reimbursement of any reasonable cost incidental to the prompt and orderly termination of this Memorandum of Understanding, including the cost of incidental and indirect cost incurred in the consultancy period to date of termination.

C. Obligations of the Consultant

20. General

a) Standard of Performance

20.1. The Consultant shall perform the Services and carry out the Services with all due diligence, efficiency and economy, in accordance with generally accepted professional standards and practices, and shall observe sound management practices, and employ appropriate technology and safe and effective equipment, machinery, materials and methods. The Consultant shall always act, in respect of any matter relating to this Memorandum of Understanding or to the Services, as a faithful adviser of the Client, and shall at all times support and safeguard the Client's legitimate interests in any dealings with the third parties.

20.2. The Consultant shall employ and provide such qualified and experienced Experts and Sub-consultant as are required to carry out the Services.

20.3. The Consultant may subcontract part of the Services to fulfil the nature of work mentioned in Terms of Reference Appendix B. The Consultant shall retain full responsibility for the Services

b) Law Applicable to Services

20.4. The Consultant shall perform the Services in accordance with the Memorandum of Understanding and the Applicable Law and shall take all practicable steps to ensure that any of its Experts and Sub-consultant comply with the Applicable Law.

20.5. The Client shall notify the Consultant in writing of relevant local customs, and the Consultant shall, after such notification, respect such customs.

21. Conflict of Interests

21.1. The Consultant shall hold the Client's interests paramount, without any consideration for future work, and strictly avoid conflict with other assignments or their own corporate interests

a) Consultant Not to Benefit from Commissions, Discounts, etc

21.1.1. The payment of the Consultant pursuant to GCMoU (Clauses GCMoU 37 through 41) shall constitute the Consultant's only payment in connection with this Memorandum of Understanding and, the Consultant shall not accept for its own benefit any trade commission, discount or similar payment in connection with activities pursuant to this Memorandum of Understanding or in the discharge of its obligations hereunder, other than the Payment and revenue sharing options mentioned in this MOU and the Consultant shall use its best efforts to ensure that any Sub-consultant, as well as the Experts and agents of either of them, similarly shall not receive any such additional payment,.

21.1.2. Furthermore, if the Consultant, as part of the Services, has the responsibility of advising the Client on the procurement of goods, works or services, the Consultant shall comply with the Client's Applicable Guidelines, and shall at all times exercise such responsibility in the best interest of the Client. Any discounts or commissions obtained by the Consultant in the exercise of such procurement responsibility shall be for the account of the Client

b) Consultant and Affiliates Not to Engage in Certain Activities

21.1.3. The Consultant agrees that, during the term of this Memorandum of Understanding and after its termination, the Consultant and any entity affiliated with the Consultant, as well as any Sub-consultant and any entity affiliated with such Sub-consultant shall be disqualified from providing goods, works or non-consulting services resulting from or directly related to the Consultant's Services for the preparation or implementation of the project, unless otherwise indicated in the SCMoU

c) **Prohibition of Conflicting Activities**

21.1.4. The Consultant shall not engage, and shall cause its Experts as well as its Sub-consultant not to engage, either directly or indirectly, in any business or professional activities that would conflict with the activities assigned to them under this Memorandum of Understanding

d) **Strict Duty to Disclose Conflicting Activities**

21.1.5. The Consultant has an obligation and shall ensure that its Experts and Sub-consultant shall have an obligation to disclose any situation of actual or potential conflict that impacts their capacity to serve the best interest of their Client, or that may reasonably be perceived as having this effect. Failure to disclose said situations may lead to, the disqualification of the Consultant or the termination of its Memorandum of Understanding.

22. Confidentiality

22.1. Except with the prior written consent of the Client, the Consultant and the Experts shall not at any time communicate to any person or entity any confidential information acquired in the course of the Services, nor shall the Consultant and the Experts make public the recommendations formulated in the course of, or as a result of, the Services

23. Liability of the Consultant

23.1. Subject to additional provisions, if any, set forth in the SCMoU, the Consultant's liability under this Memorandum of Understanding shall be provided by the Applicable Law.

24. Insurance to be taken out by the Consultant

24.1. The Consultant (i) shall take out and maintain, and shall cause any Sub-consultant to take out and maintain, at its own cost but on terms and conditions approved by the Client, insurance against the risks, and for the coverage specified in the SCMoU, and (ii) at the Client's request, shall provide evidence to the Client showing that such insurance has been taken out and maintained and that the current premiums therefore have been paid. The Consultant shall ensure that such

insurance is in place prior to commencing the Services as stated in Clause GCMoU 13.

25. Accounting, Inspection and Auditing

25.1. The Consultant shall keep, and shall make all reasonable efforts to cause its Sub-consultant to keep, accurate and systematic accounts and records in respect of the Services and in such form and detail as will clearly identify relevant time changes and costs

25.1.1. The Consultant shall permit and shall cause its Sub-consultant to permit, the Client and/or persons appointed by the Client to inspect the Site and/or all accounts and records relating to the performance of the Memorandum of Understanding and the submission of the Proposal to provide the Services, and to have such accounts and records audited by auditors appointed by the Client if requested by the Client The Consultant's attention is drawn to Clause GCMoU 10 which provides, inter alia, that acts intended to materially impede the exercise of the Client's inspection and audit rights provided for under this Clause GCMoU25.2 constitute a prohibited practice subject to Memorandum of Understanding termination (as well as to a determination of ineligibility under the Clients' prevailing sanctions procedures.)

26. Reporting Obligations

26.1. The Consultant shall submit to the Client the reports and documents specified in Appendix B, in the form, in the numbers and within the time periods set forth in the said Appendix

27. Proprietary Rights of the Client in Reports and Records

27.1. Unless otherwise indicated in the SCMoU, all reports and relevant data and information such as maps, diagrams, plans, databases, other documents and software, supporting records or material compiled or prepared by the Consultant for the Client in the course of the Services shall be confidential and become and remain the absolute property of the Client. The Consultant shall, not later than upon termination or expiration of this

Memorandum of Understanding, deliver all such documents to the Client, together with a detailed inventory thereof. The Consultant may retain a copy of such documents, data and/or software but shall not use or share the same for purposes unrelated to this Memorandum of Understanding without prior written approval of the Client

27.1.1. Integrated agriculture data hub and digital farmer services platform, customized and cloud deployed as per the scope of work mentioned in Terms of Reference Appendix (B) will be handed over along with source code to the client for the parts of system developed during this engagement. The Client shall have all necessary right to use, host and modify the system for future development and troubleshooting needs of non-commercial nature. Other restrictions about the future use of the system and documents if any shall be specified in SCMoU-

28. Equipment, Vehicles and Materials

28.1. Equipment, vehicles and materials made available to the Consultant by the Client or purchased by the Consultant wholly or partly with funds provided by the Client, for a specific purpose as agreed in writing beforehand, shall be the property of the Client and shall be marked accordingly. Upon termination or expiration of this Memorandum of Understanding, the Consultant shall make available to the Client-an inventory of such equipment, vehicles and materials and shall dispose of such equipment, vehicles and materials in accordance with the Client's instructions. While in possession of such equipment, vehicles and materials, the Consultant, unless otherwise instructed by the Client in writing, shall insure them at the expense of the Client in an amount equal to their full replacement value

28.2. Any equipment or materials brought by the Consultant or its Experts into the Client's country for the use either for the project or personal use

shall remain the property of the Consultant or the Experts concerned as applicable

D. Sub-Consultants

29. Description of Sub-Consultants

29.1. "Sub-consultants" means an entity, who is technical partner to the Consultant, whom the Consultant subcontracts any part of the Services while remaining solely liable for the execution of the Memorandum of Understanding.

30. Replacement of Sub-Consultants

30.1. Sub-Consultant as the Client may otherwise agree in writing, no changes shall be made in the Sub-Consultants

30.2. Notwithstanding the above, the substitution of Sub-Consultant during period of Memorandum of Understanding execution may be considered only based on the Consultant's written request and due to circumstances outside the reasonable control of the Consultant, including but not limited to death or medical incapacity. In such case, the Consultant shall forth with provide as a replacement, a sub-Consultant of equivalent or better qualifications and experience, and at the same rate of remuneration.

31. Removal of Sub-consultants

31.1. If the Client finds that any of the Sub-consultant has committed serious misconduct or has been charged with having committed a criminal action, or shall the Client determine that Consultant's Expert of Sub-consultant have engaged in corrupt, fraudulent, collusive, coercive or obstructive practice while performing the Services, the Consultant shall, at the Client's written request, provide a replacement.

31.2. In the event that any of Sub- consultant is found by the Client to be incompetent or incapable in discharging assigned duties, the Client, specifying

the grounds, therefore, may request the Consultant to provide a replacement.

31.3. Any replacement of the removed Sub-consultant shall possess better qualifications and experience and shall be acceptable to the Client.

31.4. The Consultant shall bear all costs arising out of or incidental to any removal and/or replacement of such Sub-Consultant

E. Obligations of the Client

32. Assistance and Exemptions

32.1. Unless otherwise specified in the SCMoU, the Client shall use its best efforts to:

a) Assist the Consultant with obtaining work permits and such other documents as shall be necessary to enable the Consultant to perform the Services.

b) Issue to officials, agents and representatives of the Government all such instructions and information as may be necessary or appropriate for the prompt and effective implementation of the Services.

c) Provide to the Consultant any such other assistance as may be specified in the **SCMoU**.

33. Access to Project Site

33.1. The Client warrants that the Consultant shall have, free of charge, unimpeded access to the project site in respect of which access is required for the performance of the Services. The Client will be responsible for any damage to the project site or any property thereon resulting from such access and will indemnify the Consultant and each of the experts in respect of liability for any such damage, unless such damage is caused by the willful default or negligence of the Consultant or any Sub-consultant or the Experts of either of them

34. Change in the Applicable Law Related to Taxes and Duties

34.1. If, after the date of this Memorandum of Understanding, there is any change in the applicable law in the Client's country with respect to taxes and duties which increases or decreases the cost incurred by the Consultant in performing the Services, then the remuneration and reimbursable expenses otherwise payable to the Consultant under this Memorandum of Understanding shall be increased or decreased accordingly by agreement between the Parties hereto, and corresponding adjustments shall be made to the ceiling amounts specified in Clause GCMoU 38.1

35. Services, Facilities, Data and Property of the Client

35.1. The Client shall make available to the Consultant and the Sub consultant/ Vendors/Developer, for the purposes of the Services and free of any charge, the services, and facilities as per in the **Terms of Reference (Appendix B)** at the times and in the manner specified in said **Appendix A.**

35.2. The Client shall provide access to all the data/information available with them and needed for the services mentioned in the **Terms of Reference (Appendix B)** free of cost and facilitate the process of data collation from other Central Governments, State Governments or other Agencies by issuing permissions, authorization letters etc. so as to facilitate the consultant to complete the project in time.

35.3. So as to ensure meeting the timeline of the project, at least 75% of the historical data be made available to consultant by the client in a good, readable and digital format within 3 months from the date of the MoU

35.4. The Client shall provide office working space of not more than 100 sqft and electricity free of cost to the Consultant and Sub-consultant during the contract period (excluding warranty period). Any other basic

amenities like internet connectivity, IT equipments, furniture, stationary etc shall be borne by the Consultant/Sub consultant/ Vendors/Developer

35.5. The Client shall bear all the expenses of their personnel for travel, stay and daily expenses incurred for various activities under the Services.

36. Counterpart Personnel

36.1. The Client shall make available to the Consultant free of charge such professional and support counterpart personnel, to be nominated by the Client with the Consultant's advice, if specified in **Appendix B.**

36.2. Professional and support counterpart personnel, excluding Client's liaison personnel, shall work under the exclusive direction of the Consultant. If any member of the counterpart personnel fails to perform adequately any work assigned to such member by the Consultant that is consistent with the position occupied by such member, the Consultant may request the replacement of such member, and the Client shall not unreasonably refuse to act upon such request.

37. Payment Obligation

37.1. Inconsideration of the Services performed by the Consultant under this Memorandum of Understanding, the Client shall make such payments to the Consultant for the deliverables specified in **Appendix B** and in such manner as is provided by GCMoU F below.

F. Payments to the Consultant

38. Memorandum of Understanding Price

38.1. The Memorandum of Understanding price is fixed and is set forth in the **SCMoU**. The Memorandum of Understanding price breakdown is provided in **Appendix D**

38.2. Any change to the Memorandum of Understanding price specified in Clause 38.1 can be made only if the Parties have agreed to the revised scope of Services pursuant to Clause GCMoU 16 and have amended in writing the Terms of Reference in **Appendix B.**

39. Taxes and Duties

39.1. The Consultant, Sub-consultant and Experts are responsible for meeting any and all tax liabilities arising out of the Memorandum of Understanding unless it is stated otherwise in the **SCMoU.**

39.2. As an exception to the above and as stated in the **SCMoU**, all local identifiable indirect taxes (itemized and finalized at Memorandum of Understanding negotiations) are reimbursed to the Consultant or are paid by the Client on behalf of the Consultant.

40. Currency of Payment

40.1. Any payment under this Memorandum of Understanding shall be made in the currency(ies) specified in the **SCMoU**

41. Mode of Billing and Payment

41.1. The total payments under this Memorandum of Understanding shall not exceed the Memorandum of Understanding price set forth in Clause GCMoU 38.1

41.2. The payments under this Memorandum of Understanding shall be made in lump-sum installments against deliverables specified in **Appendix B**. The payments will be made according to the payment schedule stated in the SCMoU

41.3.

41.3.1. The Consultant shall provide a performance Security of 2.5% of total cost of implementation under this Memorandum of Understanding.

41.3.2. The Lump-Sum Installment Payments. The Client shall pay the Consultant within Sixty

(60) days after the receipt by the Client of the deliverable(s) and the cover invoice for the related lump-sum installment payment. The payment can be withheld if the Client does not approve the submitted deliverable(s) as satisfactory in which case the Client shall provide comments to the Consultant within the same Sixty (60) days period. The Consultant shall thereupon promptly make any necessary corrections, and thereafter the foregoing process shall be repeated.

41.3.3. The Final Payment. The final payment under this Clause shall be made only after the final system as per the Appendix B, have been submitted by the Consultant and approved as satisfactory by the Client. The Services shall then be deemed completed and finally accepted by the Client. The last lump-sum installment shall be deemed approved for payment by the Client within ninety (90) calendar days after receipt of the final report by the Client unless the Client, within such ninety (90) calendar day period, gives written notice to the Consultant specifying in detail deficiencies in the Services, the final report. The Consultant shall thereupon promptly make any necessary corrections, and thereafter the foregoing process shall be repeated.

41.3.4. All payments under this Memorandum of Understanding shall be made to the accounts of the Consultant specified in the SCMoU

41.3.5. With the exception of the final payment under 41.2.3 above, payments do not constitute acceptance of the whole Services nor relieve the Consultant of any obligations hereunder

42. Interest on Delayed Payments

42.1. If the Client had delayed payments beyond fifteen (15) days after the due date stated in Clause

GCMoU 41.2.2 (c), interest shall be paid to the Consultant on any amount due by, not paid on, such due date for each day of delay at the annual rate stated in the **SCMoU**

G. Fairness and Good Faith

43. Good Faith

43.1. The Parties undertake to act in good faith with respect to each other's rights under this Memorandum of Understanding and to adopt all reasonable measures to ensure the realization of the objectives of this Memorandum of Understanding

H. Settlement of Disputes

44. Amicable Settlement

44.1. The Parties shall seek to resolve any dispute amicably by mutual consultation.

44.2. If either Party objects to any action or inaction of the other Party, the objecting Party may file a written Notice of Dispute to the other Party providing in detail the basis of the dispute. The Party receiving the Notice of Dispute will consider it and respond in writing within fourteen (14) days after receipt. If that Party fails to respond within fourteen (14) days, or the dispute cannot be amicably settled within fourteen (14) days following the response of that Party, Clause GCMoU 45.1 shall apply.

45. Dispute Resolution

45.1. Any dispute between the Parties arising under or related to this Memorandum of Understanding that cannot be settled amicably may be referred to by either Party in accordance with the provisions specified in the **SCMoU**

III. Special Conditions of Memorandum of Understanding

<table>
<tr><td>Number of G C Clause</td><td>Amendments of, and Supplements to, Clauses in the General Clause Conditions of Memorandum of Understanding</td></tr>
<tr><td>1.1(b) and 3.1</td><td>The Memorandum of Understanding shall be construed in accordance with the law of India</td></tr>
<tr><td>4.1</td><td>The Language is: English</td></tr>
<tr><td>6.1 and 6.2</td><td>The addresses are:

Client:

Consultant:</td></tr>
<tr><td>9.1</td><td>The Authorized Representatives are:</td></tr>
<tr><td>11.1</td><td>The effectiveness conditions is the date of Signing the of the Memorandum of Understanding</td></tr>
<tr><td>12.1</td><td>Termination of Memorandum of Understanding for Failure to Become Effective:
The Time period shall be one Month</td></tr>
<tr><td>13.1</td><td>Commencement of Services
The Number of days shall be Ten</td></tr>
<tr><td>14.1</td><td>Expiration of Memorandum of Understanding: 6 years
The time period shall be 12 Months of Development of Integrated Agriculture Data Hub and Digital Farmer Services Platform in 12 months in 3 phases (Phase-1 to be completed within 6 months from start of project, Phase-2 to be completed within 9 months from the start of the project, Phase 3 to be completed within 12 months from the start of the project) and (5 years of operation, Maintenance and Hosting)

<table>
<tr><th>#</th><th>Phase</th><th>Deliverable</th><th>Timelines (T = Start of the Project)</th></tr>
<tr><td colspan="4">Integrated Agriculture Data Hub and Digital Farmer Service Platform</td></tr>
</table>
</td></tr>
</table>

1. Phase -1 (Development and Final Go Live of the Modules)			
1	*1.1*	*Inception Report*	*T+ 0.5 Months*
	1.2	*Submission of Design Documents*	*T + 2 Months*
	1.3	*Creation of Unified agriculture database*	*T+ 3 Months*
	1.4	*Creation of Geoportal and Mobile Application*	*T+ 3 Months*
	1.5	*Creation of AI Based field boundary detection Module*	*T+ 3 Months*
	1.6	*Creation/integration of Unified farmer database*	*T+ 3 Months*
	1.7	*Creation of Farmer and Admin user accessibility*	*T+ 3 Months*
	1.8	*Creation of Crop Classification & acreage estimation Module via remote sensing Module*	*T+ 4 Months*
	1.9	*Creation of Harvesting assessment Module via remote sensing*	*T+ 5 Months*
	1.10	*Creation of Farmer Helpdesk*	*T+ 6 Months*
	1.11	*Creation of Soil Information Module*	*T+ 6 Months*
2. Phase -2 (Development and Final Go Live of the Modules)			
2	*2.1*	*Agro-climatic crop zone planning Module*	*T+ 9 Months*
	2.2	*Near real-time crop health monitoring Module*	*T+ 9 Months*
	2.3	*Crop yield assessment & Production cluster management Module*	*T+ 9 Months*
	2.4	*Soil Moisture based*	*T+ 7*

			irrigation Module	*Months*
		2.5	*Extreme event warning and management Module*	*T+7 Months*
		2.6	*Crop loss prediction & assessments Module*	*T+ 8 Months*
		2.7	*Farm mechanization Module*	*T+ 9 Months*
		2.8	*Agro advisory services Module*	*T+ 8 Months*
		2.9	*Centralized DBT Management Module*	*T+ 8 Months*
	3. Phase -3 (Development and Final Go Live of the Modules)			
	3	*3.1*	*Farming the carbon (GHG emission, carbon sequestration, carbon credit)*	*T+10 Months*
		3.2	*Crop insurance Module*	*T+10 Months*
		3.3	*Integration with e-marketplaces*	*T+11 Months*
		3.4	*Water resource information for Irrigation potential Module*	*T+12 Months*

Operation and Maintenance

Operation Stage

4	*4.1*	*Hosting after Go-Live*	*T+12 Months to T+72 Months*
	4.2	*Operation Support*	*T+12 Months to T+72 Months*
	4.3	*Maintenance Support*	*T+12 Months to T+ 72 Months*

19.1.1(f)	Not applicable
21 b.	The Client reserves the right to determine on a case-by-case basis whether the Consultant should be disqualified from providing goods, works or non-consulting services due to a conflict of a nature described in Clause GCMoU 21.1.3

23.1	Limitation of the Consultant's Liability towards the Client: Consultants shall be liable for Liquidated Damages. (a) Except in the case of gross negligence or willful misconduct on the part of the Consultant or on the part of any person or a firm acting on behalf of the Consultant in carrying out the Services, the Consultant, with respect to damage caused by the Consultant to the Client's property, shall not be liable to the Client: (i) for any in direct or consequential loss or damage; and (ii) for any direct loss or damage that exceeds twice the total value of the Memorandum of Understanding; (b) This limitation of liability shall not (i)affect the Consultant's liability, if any, for damage to Third Parties caused by the Consultant or any person or firm acting on behalf of the Consultant in carrying out the Services; (ii) be construed as providing the Consultant with any limitation or exclusion from liability which is prohibited by the Applicable Law in the Client's country. (c) Liquidated Damages @ 0.5% for delay of each fortnight of the cost of the delayed work subject to a maximum of 3% of the cost of the delayed services from the mutually agreed time schedule of the completion of that component of the services after allowing a grace period of one month will be deducted from the charges payable to Consultant. These LD charges will be applicable except for the circumstances which are beyond the control of consultant and subject to force majeure conditions not prevailing. In relation to delays where delays are not attributable to consultant and levy of LD is not proposed, extension of time without any penalty shall be considered with the approval of the Client.
23.2	The insurance coverage against the risks shall be as follows: (a) employer's liability and workers' compensation insurance in respect of the experts and Sub-consultant in accordance with the relevant provisions of the applicable law in the Client's country, as well as, with respect to such Experts, any such life, health, accident, travel or other insurance as may be appropriate; and (b) insurance against loss of or damage to (i) equipment purchased in

	whole or in part with funds provided under this Memorandum of Understanding, (ii) the Consultant's property used in the performance of the Services, and (iii) any documents prepared by the Consultant in the performance of the Services.
30	Time for replacement shall be One Month
37 and 38.1	Total cost of Development of Integrated Agriculture Data Hub and Digital Farmer Services Platform as CaPex- INR (inclusive of GST) and Operation and Maintenance OpEx INR (inclusive of GST) per Annum for Five Years .
38.1 and 38.2	The Client warrants that the consultant cannot charge any tax other than GST
39	Indian Rupees
40	Payment Terms:
40.3.4	The accounts are: Name of Beneficiary:
41.1	The Interest rate is NIL.
44.1	Disputes shall be settled by arbitration in accordance with the following provisions: (a) Disputes if any, shall be resolved by Managing Director, NABARD Consultancy Services Pvt. Ltd. by giving an adequate opportunity for hearing and presenting their case to both the parties. (b) If dissatisfied by the order of Secretary under above clause, either parties may approach the Honourable High Courts with in jurisdiction of New Delhi

IV. Appendix A – Selection Notice (LOA)

V. Appendix B – Terms of Reference

(SCOPE OF WORK will attached)

VI. Appendix C –Payment Schedule

(Payment Schedule will be attached)

VII. Appendix D – Break Down of Memorandum of Understanding Price

(to be attached)